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Diet and Eye Health*

Walter F. King, M.D.

THE author points out that "many eye troubles are due to upsets in the physico-chemical equilibrium." We need more minerals, especially calcium, in our diet; the main sources of calcium are milk and green vegetables

SINCE the earliest of times people knew that there was a relation between the food eaten and the development of the body. In ancient Egypt the literature records instances of people living on restricted diets who saw poorly at twilight. Naturally, our knowledge of foods and their values was increasing through the ages, but the real impetus for extensive study arose during the World War.

Slogans played a large part in bringing to the people the importance of foods in war. "Food will win the war" led the slogan list. We all recall the meatless Sundays, sugarless Mondays, breadless Tuesdays and so on, without enough days to cover the work. All this brought our attention to the various values of food.

For some time it has been known that foods contain something just as important as carbohydrates, fats and proteins. It was not until 1912 that the word "vitamin" was coined as a name for these unknown substances in food. And now, in 1933, we still do not know what a vitamin is, although we have been able to separate them into seven groups and show, in part, the necessity of each one to the normal performance of bodily functions.

What is a food? Anything which, when taken into the body, serves to nourish or build up the tissues or to supply heat.

* Presented at the Institute on Conservation of Vision, given under the auspices of the New York State Commission for the Blind, Prevention of Blindness, April 28–29, 1933.

What are the constituents of foodstuffs?

1. Proteins
2. Carbohydrates
3. Fats
4. Minerals
5. Vitamins
6. Water

Proteins

The proteins are absolutely necessary to life. As the tissue is used in metabolism the proteins replace it. Our first source of protein is meat, or animal protein, which is also the best in quality. Proteins are found especially in meats, fish, eggs and milk. Vegetable proteins, though not as good in quality, have a certain chemical composition which is needed for proper nourishment. Vegetable proteins are found especially in cereals, beans, peas and nuts. The highest nutritive values are found in liver and kidney protein, both of which play a small rôle in the average diet.

Recent investigation showed that proteins of poor quality, along with a deficiency in vitamin A, will produce xerophthalmia quicker than proteins of high quality. An experiment carried out in 1930 showed that proteins have a decided effect on increasing tissue healing. This is important not only in eye surgery, but in the healing of eye diseases and wounds the recuperative period is shortened, and the chance for a serious outcome is lessened.

Normally, the body forms proteins which act against disease; directly, by destroying the germs, or indirectly, by neutralizing poisons produced by germs. This is part of the defensive mechanism we hope to increase when we give protein injections or injections to avoid diphtheria.

Carbohydrates

The carbohydrates or sugars make up a large part of our diet and are chiefly concerned with the production of energy.

Sugars are found in most of the things we eat, either as a part of the food or added for flavoring. The storehouses for sugars are especially the liver and muscles. There is now good evidence that sugar is stored in the skin. This is important in skin diseases

and superficial eye conditions. Cases of blepharitis, lid eczemas and corneal trouble often respond well to rigid curtailing of carbohydrates; and the disease readily returns when the offending foods are used again.

Let us not overlook diabetes, a disease that is brought about when the body is unable to utilize the sugars. Many of the diabetic patients with high blood sugar develop diabetic cataract. These cataracts are rapid in onset and are operable. Results of operation are less favorable than in simple cataract, due to the poor healing of the wound and the susceptibility to iritis. Again, we see the seriousness of eye disease complicated by diabetes, in the condition called retinitis, with its destructive effects on vision.

Before leaving the subject of sugars, let us take due warning of our increasing consumption and why we must be watchful. The average yearly consumption is over 100 pounds per capita over and above the requirements of the body. Sugar does not contain a single vitamin or essential mineral salt. We can say that the continued consumption of large amounts of non-protective substances, such as sugar, without a corresponding increase of protective substances, might in time react on the body and on a delicate organism such as the eye, with its sensitive vascular system. The increase in the consumption of protective substances, such as proteins and vitamins, has not increased as has sugar consumption.

The daily need of carbohydrates—including sugars and starches, which are converted into sugar in the body—is 350 grams, or between one-half and two-thirds of a pound.

Fats

The third common foodstuffs are the fats, which represent the most concentrated form of energy foods. Fats are stored in the body and act as sources of energy. Fats are not only taken into the body as such, but are synthesized in the body from carbohydrates. Remember this when you feel inclined to eat a half pound or so of candy.

There are two kinds of fat stored in the body: one type, so-called "glandular," because it has the appearance of gland tissue; and the other, just the ordinary adipose tissue. Investigation has shown that vitamin A is stored in the glandular type of fat.

It is as a conveyor of vitamin A that fat plays an important part in relation to the eye. The animal source of fats is very important in diet in contrast to vegetable fats, which contain little or no vitamin A and none of the other vitamins. Vitamin A we shall consider a bit later.

Minerals

The next large group of foodstuffs are the minerals. The function of each of them is not yet known and much remains to be found out about their action. The important minerals in metabolism are calcium, copper, iodine, iron, phosphorus, potassium and sodium. At the present time we know something about calcium and very little about sodium, and of the others nothing at all in relation to the eye. Calcium is found in larger amounts in the body than any other mineral, and is lacking more frequently than any of the other elements in our diet.

Calcium.—A certain type of eye disease called vernal conjunctivitis usually shows calcium deficiency in the blood. Exactly how this deficiency works is not clear, but evidence is appearing to show that calcium protects against excessive intake of carbohydrates and proteins which can cause hyperplasia of the conjunctival tissue. The main sources of calcium are milk and its products, green vegetables, oranges, nuts and cereals.

Animal experimentation has shown that blindness can develop in low calcium diets. The diets were well balanced in all other respects. Examination showed the blindness was due to degeneration of the optic nerve. Cod liver oil added to the rations will prevent the condition.

Sodium.—Sodium is found chiefly as sodium chloride, or salt. A good mixed diet contains sufficient sodium without the addition of salt, which means an extra burden on the kidneys. Early inflammation of the retina can often be arrested by salt-free diets, as shown by the work of Volhard and Allen.

Vitamins

The composition and action of vitamins are still an unknown quantity, but they appear to be analogous to hormones. An extensive medical literature has grown up on this subject, but let

us try to confine ourselves to the vitamins as they relate to the eye.

Vitamin A.—Vitamin A is of special interest to the eye physician. It is also called anti-ophthalmic and anti-infective—terms which in themselves tell us what the vitamin does.

In the production of ophthalmia due to vitamin A deficiency, we have two related factors at work. First is the effect on the glands that normally keep the eye in a moist condition. The secreting glands of the eye—lacrimal, Zeiss, Moll and Meibomian glands—undergo atrophy, and hence are unable to furnish moisture for the eye. At the same time we get changes in the epithelium or covering cells of the eye. They change to the squamous or keratinized type of cell found in our skin. From here on we can easily visualize the gradual loss of vision due to scarring and infection.

Foreign investigators have given us much knowledge concerning lack of vitamin A, the most detailed description being given by Dr. Pillat from Vienna, who spent three years in China, where deficiency diseases are endemic.

The first symptom the patient complains of is night blindness. The patient is still able to see, but the retina has lost much of its sensitivity and hence only responds to the stronger stimuli encountered in daylight. There is no doubt that vitamin A plays a leading rôle in the metabolism of the retina. Investigators have shown the retina to be very rich in vitamin A, containing even more than butter fats. They have also shown that the retina will become fatigued much more quickly in vitamin A deficiency.

Next follow the drying or xerotic process and pigmentation of the conjunctiva. The final stage is keratomalacia, or softening of the cornea. Naturally, when the epithelium suffers such destruction, the first line of defense is undermined and all types of infecting organisms may attack the eye.

The anti-infective property of vitamin A is not definitely established, but experiments have shown that animals on a high diet of vitamin A were better able to overcome an infection of the eye. This was also aided when vitamin B was added to the diet.

A very striking experiment was carried out in 1930 which showed the healing properties of vitamin A in connection with ultra-violet therapy in eye diseases.

Results in approximately 40 cases with vitamin A and 40 cases without vitamin A, are as follows:

With vitamin A—improvement noticed after 6 doses of ultra-violet light.

Without vitamin A—improvement noticed after 11.8 doses of ultra-violet light.

After use of vitamin A—cured after 16 doses of ultra-violet light.

Without use of vitamin A—cured after 27 doses of ultra-violet light.

Vitamin A is found liberally in milk and its products, cod liver oil, eggs, liver, kidney and some vegetables—carrots, lettuce, spinach, tomatoes and bananas.

Recently a substance called "carotene" was isolated from carrots and other vegetables which has the same action as vitamin A. It is thought this is a precursor to vitamin A.

The body stores vitamin A. As stated, it is abundant in the retina, liver and fatty tissue. The fate of vitamin A in disease is shown in the work of Wolff, who determined the amount of vitamin A in the livers of patients who died from acute and chronic diseases. Acute diseases showed 20.7 units per gram of liver; chronic diseases—6 units per gram of liver.

Newborn infants show very little vitamin A. This emphasizes the importance of furnishing a generous supply of vitamin A for the nursing mother and the necessity to keep up the supply in chronic diseases.

Vitamin B.—Vitamin B was first associated with a disease called beriberi or polyneuritis. Now we know that vitamin B has two independent fractions: B_1 concerned in neuritis and B_2, sometimes called vitamin G, deficiency of which is associated with pellagra.

B_1 deficiency shows toxic substances affecting the nervous system. Patients are nervous and irritable, and complain that their eyes tire easily. Diseases of the uveal part of the eye show improvement on a diet rich in vitamin B.

B_2 or G, which is related to pellagra, also produces a variety of ocular symptoms—tearing, conjunctivitis, corneal and vitreous opacities.

Thus, vitamin A is related to vitamin B in many actions, and both acting together seem to play a major rôle in eye disease.

The body stores very little of vitamin B, hence the need of vitamin B in our daily diet. It is found especially in milk, eggs, vegetables, cereals, liver and kidney.

Vitamin C.—Concerning vitamin C and the eye, we have little or no evidence of a direct relation. Cases of vitreous and retinal hemorrhage of unknown etiology are thought to be associated with lack of vitamin C.

Indirectly, vitamin C affects the eyes in the deficiency disease, scurvy, which affects the general nutrition in a marked degree.

The body does not store vitamin C, hence the constant need of it in our diet. It is found especially in fruits and vegetables; milk contains a little; meats and cereals practically none.

Vitamin D.—Like vitamin C, vitamin D is little concerned with eye nutrition directly. Primarily vitamin D has to do with calcium metabolism and also with the parathyroid glands.

Now in the lens of the eye, we may find a cataract associated with tetany, and in tetany the calcium level in the blood is low. The person, usually a child, need not have marked symptoms of tetany but often shows only mild convulsions. The normal growth of the lens is disturbed at the time so that opaque lens fibers are laid down. When the condition has subsided, the lens again lays down transparent fibers. As the lens in our eye grows continuously, we can tell from the position of the opacity the approximate age at which the patient suffered this nutritional upset.

So far, vitamin D is the only vitamin manufactured from a chemical compound. Vitamin D is ergosterol, and, when irradiated with ultra-violet light, its value is increased. This vitamin is stored to a slight extent in the body.

Few natural foods contain Vitamin D, among them being cod liver oil, liver, and eggs; milk and vegetables supply only small amounts.

Vitamin E.—Vitamin E plays its rôle in fertility and possibly in the assimilation of iron.

Let us not forget that well-known condition called allergy. It is well known that certain foods cause urticaria, eczema, asthma, etc. Likewise certain foods may cause conjunctivitis. Several

cases are reported as caused by strawberries, tomatoes, eggs, etc. The cases did well on removal of the cause; all reacted to skin tests, and symptoms returned when the offending foods were again used.

Summary

The metabolism of the eye is very delicate and complex. It seems more and more, as research goes on, that many eye troubles are due to upsets in the physico-chemical equilibrium.

Proteins are plentiful in our diet but the quality must not be forgotten.

Carbohydrates play too large a part in our diet. We are using two to three times the amount required. Let us get away from routine cereals, bread, potatoes and rich pastry.

Let us remember the body needs minerals; especially calcium, which is the mineral most deficient in our diet.

All the vitamins are important. Vitamin C is usually lacking in our diets.

Remember that vitamins A, B and D are especially concerned with eye nutrition.

How can we know we are doing right? First, let us forget about the number of calories needed and all this excess standardization. Choose a diet of milk and its products, eggs, green vegetables, fruits, small amounts of meat and restrict the amount of carbohydrates, especially our American "meal cap"—pastries—except, of course, on special occasions.

As the final word, let me emphasize that the interest lies not only in well-defined eye disease, but especially in the fact that chronic deficiencies produce numerous vague and borderline cases which we fail to recognize early. It is the interruption of disease in these early stages which makes for real medical progress.

Vision and Other Tests for Automobile Drivers*

Maxwell Halsey

MORE thorough vision testing is urged for applicants for automobile drivers' licenses. Only 16 states have any drivers' license law at the present time

THE cheapest car you can buy today will go 75 miles per hour. It is being operated upon roadways which encourage a high speed. But conditions and circumstances frequently require a slow speed if accidents are to be avoided. This requires a great deal of ability and judgment on the part of the driver if he is to drive in accordance with conditions and to resist the temptation of smooth roadway surfaces and fast cars. Accident records show that drivers have not been able to realize the disparity between potential or encouraged speeds and the conditions requiring slower speeds.

It takes years of training before a man is permitted to run a locomotive—which runs on a private right-of-way at speeds lower than the potential of the automobile—yet we permit men with no formal training, and in most states, no examination, to drive a vehicle capable of doing terrific damage.

Street and highway speeds are still increasing and will continue to do so. This places a high premium on the ability of the driver and brings into play some factors not important at the lower speeds. This is indicated by the fact that although the number of autocides decreased last year, the deaths and non-fatal injuries per accident actually increased.

The increased speed of the heavier units, such as trucks and

*Presented at the Greater New York Safety Conference, New York City, during the session on the "Eye."

buses, is another element which places a premium on the operator. It is harder to control them and they are capable of far greater damage if they get out of control.

Are Drivers' Examinations What Are Needed?

In attempting to improve present conditions it is necessary to analyze each project and see if it is exactly what is needed at the time and if it will operate in such a way as to develop and utilize all factors in the situation. It is believed that drivers' examinations of the right sort are exactly what the present situation requires. It is felt that their effective application can produce an improvement of at least 30 per cent.

Develop Contact with Motorist.—Safety education has been effective with children, because, to a certain extent, we have considerable control over them. The fact that they are in the act of receiving formal education provides this control. Industrial and fleet accidents have diminished materially. In their cases the control was brought about by the employer-employee relationship. The element which has made it difficult to improve the private driver situation has been the total absence of control. A driver's examination makes an important contact with the motorist and helps to establish some degree of control. Without this change in the situation real improvement is not possible.

Importance of the Driver.—It must be admitted that of all the elements in the traffic accident situation the driver is the most important. This will be particularly true until the differences between comfortable and safe speeds have been reduced. It is essential that motorists be pulled into the prevention program. Their actual participation in an examination will do much to accomplish this.

Accident-Prone Drivers.—It has been definitely established that there is a marked difference in drivers. Recent statistics from Connecticut show that in that state 15 per cent of the drivers are responsible for 100 per cent of the accidents.* It should be obvious that we should not wait for a long string of accidents and then take punitive action. The examination provides the meas-

**The Trouble Makers*, Robin B. Stoeckel, Department of Motor Vehicles, Bulletin No. 90, State of Connecticut, 1932.

uring stick by which we can judge motorists without having to wait for so much damage to be done.

What Is the Purpose of Drivers' Examinations?

There have been many conflicting statements regarding the purpose of drivers' examinations. Some have held that the chief purpose is to keep the poor drivers off the road. This has naturally had a bad public reaction, since it is of negative character. The duty of the state is to assist the citizens and to protect them. Strictly punitive measures should not be emphasized and should be used as a last resort. The following are believed to be the chief aims of examinations: Education; correction of defects; education of accident-prone drivers; removal of unsafe drivers from roadways; and establishment of standards of attainment.

Education.—The chief purpose of drivers' license examinations should be to educate the motorist—to encourage him to learn enough so that he will not cause injury to himself and to others. There is no other method which can do this so excellently. You can spread the safety story through newspapers, over the radio, in magazines, and by public addresses, and a good part of it will roll right off the backs of the poor drivers. But if they cannot get drivers' licenses and they cannot drive until they have acquired the correct knowledge and ability, you may be sure that they will learn it. This method of teaching the motorist is positive and efficient. It corresponds closely to the formal safety education of children and to the teaching required by the employer, both of which have been so effective. This purpose can be made to have a strong public appeal—it is designed to save the life of the man who really learns how to drive safely and passes the examination. It can prevent more accidents than any other use of the examination because it reaches everyone.

Correct Defects.—The second purpose of an examination is to correct defects in operation. Here again the element of service to the public comes in. Those who pass a good examination show that they know how to drive safely. Those who fail find out what they do not know and have a chance to learn without having to have an accident demonstrate this fact for them. In the absence of real schools for driving this is the only available method of finding out

how safe a driver you are—without having to pay for an accident if you are not.

Educate Accident-Prone Drivers.—The third purpose of the examination is to pick out the accident-prone operators, show the cause of the particular difficulty, and indicate what can be done about it. The driver who has passed a good examination and still has more accidents than the average should be required to retake the examination—a more comprehensive one. His failure to avoid accidents indicates that he has either forgotten what he originally knew, that he has since acquired some defect, or that he is not using what he knows. The second examination should indicate what has happened. If he has forgotten, he has another chance to learn. If he has acquired a defect, this will be discovered and it may be possible to correct it. If he has not forgotten, but is not using what he knows, this will be discovered. If he is unwilling to apply his knowledge, strictly punitive action should be applied. It is known that many of the accident-prone drivers can be improved and turned into good drivers. The examination should indicate the cause and in many instances this cause can be removed.

Remove Small Percentage from the Roadways.—The fourth purpose of the examination is to remove from the roadway the small percentage who lack the physical or mental equipment necessary to become safe drivers. This is not the most important cause because comparatively few will fail to respond to other treatment. We require children to go to school in order to make good citizens of them. Why should we not educate and examine motorists in order to make safe citizens of them, instead of merely letting them go on and doing nothing but punish them?

Standards of Attainment Foster Competition.—The fifth purpose of examinations is to establish standards of attainment. This will foster competition among both drivers and examiners. It will set up driving as a privilege and not a right. It will make the license "ticket" mean something to its owner. He will strive to get it and to keep it, and he will want to be and think he is just a little better than the average. He will pride himself on his safety. Today we rarely hear anyone bragging about being a "safe driver." I am afraid they are ashamed of it. Most of the bragging is done about "fast drivers."

What Has Been the Effect of Drivers' Examinations and License Laws?

We believe that much can be accomplished by drivers' examinations and license laws. Let us see what has actually happened where they have really been used. A study by the National Safety Council showed that "nine states which have passed drivers' license laws with examinations since 1916 have had 29 per cent fewer motor vehicle fatalities than they would have had if they had experienced the same percentage increase as the other states." A more recent study, based on gasoline consumption, shows that the states having standard drivers' license laws have decreased their fatalities 25 per cent, whereas states without a license law showed increases from 7 to 22 per cent. The states using a substandard law without examination, for example, showed practically no change from 1926 to 1931. It would appear that the examination has played a most important part in accident reduction.

While the above is definite proof of what has been accomplished, it is believed that the extended use of these methods is capable of bringing about a still greater improvement.

What Would We Like to Know About an Automobile Driver?

Let us now consider what we should like to know about a motorist if we are to measure his driving abilities and find out whether anything can be done to improve them.

Knowledge of What Makes a Safe Driver.—The first thing we want to know is whether or not he knows what makes a safe driver. This has little to do with whether or not he knows the details of the law, or the age limit, or the weight limit, or the fines. It has to do with what caused each important rule and regulation to be promulgated, and the reasons for the various signs and signals. It also has to do with how much he knows about the little "tricks of the trade" which enable safe drivers to keep from having accidents and which are not covered by law.

Physical and Mental Equipment and Ability.—The second thing we want to know is whether the driver has the physical and mental equipment and ability to put into practice what he knows. And if he lacks any one ability, whether he can learn it or compensate for

its lack and so become a safe driver. The percentage of those who are so physically and mentally unfit to drive that they cannot be satisfactorily improved is exceedingly small.

Mechanics of Car Manipulation.—The third thing we want to know is whether the driver can manipulate his car sufficiently well for modern high speed conditions. The actual operation of cars is becoming more simple every year. Only a small percentage of those who want to drive are incapable of learning to manipulate a car satisfactorily.

Attitude of Driver Toward Public.—The fourth thing we should like to know is the attitude of the driver toward the rights of other drivers, toward the law, and toward the public as a whole. This is obviously very important. No matter how skilled in car manipulation or in a knowledge of how to avoid accidents he may be, if he chooses to ignore them he will have accidents. At first thought it might appear impossible to determine this by examination. However, motorists drive to a considerable extent by habit. It may be possible in the near future to develop tests which will measure habitual attitudes toward others. Meanwhile, as we shall see, an examiner can learn a great deal about a driver's attitude by skillful interview and by inspection of his past record.

What Can We Learn About the Driver?

Having decided what we should like to know about the automobile driver let us now consider what we can actually find out.

Knowledge Regarding Driving.—It is relatively simple to determine what the motorist knows about safe driving and the rules and signs and signals designated to encourage it. The chief aim here should be to test for a real knowledge and understanding rather than a mere memorization of words and sentences.

Car Manipulation.—It is also fairly easy to determine the ability of the driver to manipulate the vehicle. It is believed that there is much room for improvement in this direction. Certainly the ability to park a car or to shift gears on a hill does not provide much of an index as to whether the individual can avoid accidents. We want to know also, for example, whether he follows other cars too closely, whether he takes chances in passing on a slippery road, and how quickly and skillfully he stops in an emergency.

Physical and Mental Equipment.—While those applicants who are quite unfit to learn to drive a car constitute a very small percentage, they must be singled out. This is a secondary function of a driver's examination rather than the major function.

Examination Frequency.—Annual examinations for all drivers are unnecessary, but certain individuals with bad records should be examined frequently. One of the best uses of an examination is to study and measure the driver who has had accidents, find out his difficulty and attempt to cure it.

What Can We Afford to Learn About a Driver?

Theoretically our losses are severe enough to warrant our finding out almost everything we can about an automobilist. Practically, since we spend millions for highways but only thousands for safety, we must restrict our program to the bare essentials. Among the causes of accidents there is a definite concentration, so for reasons of economy in administration it would seem highly advisable to restrict our examinations to things having to do with the eight or ten principal causes of accidents and to those principles of driving which are most important from the accident standpoint.

Application of Examinations

Aside from the actual make-up of the examination the second most important thing is how it is used.

New Automobilists.—Since the majority of new applicants apparently turn out to be fair drivers, the purpose of this examination should be to educate them, to pick out any serious defects and correct them, and, after recommendations, to refuse licenses to the small percentage of those who cannot learn to drive safely. The effect of the mere requirement of an examination is obvious. The vast majority go down to take the examination with considerable timidity. Some admit that they are afraid and others are afraid to admit it. This is a significant point. When they are in that mood it is the best possible time to educate them.

Accident and Violation Repeaters.—The new driver has nothing against him on the record. In fact there is something in his favor—most of the drivers are able to keep out of trouble. There is really

less need to examine him thoroughly than there is to examine the repeater. The driver who has more convictions or accidents than the average has demonstrated that there is something wrong with his driving. He is the one who has the greatest need of a thorough examination. In fact, if insufficient money were available to examine thoroughly both new drivers and repeaters, it is felt that for the money invested the greater return would come from examining those who have demonstrated their deficiency. Furthermore, the administrator will encounter much less difficulty in stiffening and expanding examinations for repeaters than for new drivers. It is suggested that all additions to present examinations be started in their use on the repeater class.

The Place of the Eye in Drivers' Examinations

There can be no question but that the eye is of major importance in driving. Without eyes driving is impossible. The question then is not whether the eyes should be examined, but what characteristics of sight affect the accident situation. At the present time eye examinations usually cover visual acuity, field of vision and color blindness.

Accidents Due to Faulty Vision.—As far as the author can discover, the number of accidents due to faulty vision (as measured above) is negligible. Tests showed that accident-prone drivers have as good eyes as average drivers. In fact, special glasses have been placed on motorists with perfect eyesight to create distortion and it was found that distortion could be increased considerably without materially affecting the ability to avoid accidents. The ability to drive safely even though their windshields are foggy or the visibility is obstructed by snow or rain shows that many of us are able to compensate for poor visibility.

Motorists with Seriously Defective Vision.—The percentage of drivers whose vision is seriously impaired (from the viewpoint of driving) is probably very low. Those who can read only the largest letter on the Snellen chart may still not have a need for seeing clearly smaller items than that.

Status of Present Tests.—Strange as it may seem, our present eyesight tests appear to be doing us very little good. The percentage of those that the existing examination shows to be obviously

unfit is small. Of the present tests the following indicates the order of importance:

1. The field of vision test appears to have some real value, although the percentage having a restricted field of vision seems to be very small.

2. The visual acuity test appears to be of little value except in regard to the relatively few who probably cannot see the largest letter of the chart.

3. The color blind test appears to be the least valuable of all. Color blind operators have not demonstrated a tendency to have accidents. They compensate for this defect by watching traffic more closely. Our signs and signals are rapidly being standardized to a point where color blindness is not a serious point anyway.

Regarding present examinations, then, it would appear that the field of vision test should be continued, and some quick test for serious defect of eyesight should be given. Visual acuity should be studied in its relation to ability to judge speed and distance. The color blind test, if any, should be restricted to actual ability to see and interpret signs and signals. Further research should be made to see if some relationship can be found between certain other characteristics of the eye and accidents. It must naturally be recognized that an eye test, however, does have some psychological advantage. The point is that we should attempt to obtain as much practical value as possible at the same time.

Value of Eyes in Driving.—Since such items as visual acuity, field of vision, and color blindness are not a measure of the driver's ability to avoid accidents except in rare cases, let us consider just where the eye does fit into the driving picture.

It is believed that the visual ability of the eyes alone is not what affects the accident picture. It is not merely the picture which the eye presents to the driver which counts, but what that picture means to him, what he knows should be done about it, and whether he is willing to do it. Thus the problem now becomes one of a combination of the eye, the brain, and the hand. It is possible to test this so-called eye-hand co-ordination, but the present eye examinations do not do it.

Suggested tests which cover a combination of the eye and the brain follow. They are considered by the author to be of greater importance than current eye tests.

Ability to Recognize a Hazard

It should be obvious that an important ability of the driver who is able to avoid accidents is that of being able to recognize a hazard when he sees it. In this the eye plays an important part, but without the other facilities of the brain it is helpless.

For example, a man is driving down the roadway when he notices a parked car. It looks just like any other parked car—except that smoke is coming out of the exhaust. The man with the "safe eye" and the "safe brain" will immediately see the potential hazard: the car with the engine running may be just about to pull out in front of him.

A picture test showing a series of potential accident conditions has been used to determine the ability of the operator along this line. Such a test should cover such conditions as: blind intersections, bottle necks, curves, hills, slippery pavements, passing hazards.

Timing: Judging Speed and Distance

A large percentage of our accidents occur at the intersection and involve cross-movements. In almost all of these, faulty timing certainly must play an important part. This is particularly true under modern high speed conditions. The ability of the motorist to judge the speed of his own car and that of approaching cars comes into play continually. A condition far ahead may appear to be safe, but he must be able to forecast the condition as it will be when he arrives. This involves two sets of speeds and two sets of distances. Drivers differ greatly in their ability to estimate accurately these distances and speeds.

There have been several experiments on this point. Some have been carried out on the highway; others, in the laboratory. One involved two miniature electric trains, one of which travelled at a fixed speed. The speed of the other was controlled by the man being examined. The tracks crossed. The ability to avoid a collision was taken as a measure of timing ability.

Münsterberg, in 1912, carried out tests showing the reaction to complex situations involving pedestrians and street cars. He decided the lowest quarter on this test made poor drivers.

Since Münsterberg's pioneering investigations, considerable prog-

ress has been made in this direction, and it is believed that fairly practical simple methods of giving tests of timing ability can be developed.

Ability to See the Whole Picture at Once

At modern speeds it is necessary for the driver to see many things in addition to the mere roadway on which he is traveling. He must be able to see vehicles and pedestrians and to judge correctly their distance and rate of movement. He does not have time to focus his eye on each and every part of this picture. Thus the ability to see the details of the picture at a glance is an essential.

There are tests to measure this ability. Several experiments have been carried out in this direction. This involved complex situations and the individual's reactions were recorded. These took the form of responses to changing street scenes and to lights of different color in different locations.

Reaction Time

At high speeds, reaction time becomes important—not only how quickly the driver can get into action and stop his car, but how quickly he sees the changing details of the picture ahead of him and how quickly it tells him its story. It is possible to develop tests which will measure this particularly. Motion pictures of highway conditions have been used in Paris and elsewhere instead of laboratory signals.

Summary of Some Tests

In 1925 Viteles developed an examination for street car operators in which he used the following:

1. Proper reaction to objects in field of vision.
2. Ability to judge speed and distance—anticipate the movements of vehicles and pedestrians.
3. Promptness in meeting an emergency.
4. Mechanical aptitude.
5. Special qualities, information and courtesy.
6. General reliability.

He used a set of colored lights on a board 4 x 5 feet, and provided distraction by a white light on the side.

A rotating drum on which is a diagram of a complicated street system has been used in Germany. The operator was required to follow a given street.

It appears from a study of an accident-prone group that they have as good vision as normal individuals. Indeed defects and anomalies showed very slight effect on operation.

The Position of Motor Vehicle Commissioners

The Motor Vehicle Commissioners in states having standard license laws have done very well with present examinations, considering the facilities at hand. The unreasonableness of the present situation, where millions are spent for faster roads and but thousands for safety on these roads, will eventually be changed. Until that time, about all they will be able to do will be to increase their selectivity and concentrate on those main items which are known to cause most of the accidents. It is quite possible that the best place for them to extend and improve on present practice is on the repeaters who are few in number and who have provided a demonstration of their inability to avoid accidents which warrants a more thorough examination. Certain improvements can also be made in the direction of standardizing whatever examinations are now given, and the corrections; and to expand the educational features which are of primary importance, particularly in the absence of schools for driving. Improvements and expansion of examinations must be gradual. Considerable efforts are required to keep the public educated up to them.

Suggestions for a Modern Examination

The following are suggestions for a modern examination to be applied in the manner previously described.

Standardized Road Test.—No matter how simple the road test, it should be thoroughly standardized, both as to what the driver is to do, and as to what the examiner is to record. All the points to be covered should be listed. Standard practice in scoring each point should be established. This is the only way to avoid differences in judgment of individual examiners.

Under the present economic pressure the test must be short and so should cover only the most important features.

The standard test, developed under the auspices of the National Research Council, by Dr. A. R. Lauer of the Department of Psychology at Iowa State University, can well be used as a starting point.

Eyesight Test.—It is recommended that of the points now tested, those having to do with restricted field of vision be emphasized the most. Only two states, Massachusetts and Oregon, are now using this test. It is recommended that the visual acuity test be simplified and used largely to pick out those who are dangerously defective. It is recommended that the color blind test be restricted to actual signs and signals or discarded entirely. This will leave more time for the following combination eye and brain tests showing:

1. Ability of the driver to recognize a hazard.
2. The timing of the driver (his ability to judge speed and distance).
3. The ability of the driver to see "the whole picture" and not merely one part of it.
4. The reaction time of the driver to pictures which show a hazard.

Written Test.—It is strongly recommended that a written or picture test be given. In this test the major emphasis should be placed upon the educational features. The test should be designed to show an understanding of what actually constitutes safe driving rather than of the technical legislation provided to require it. Attempts to have drivers learn the details and technicalities of the law should be minimized.

Application of Examination.—Examinations should be used much more for repeaters than they are now. They should be used on all new drivers: first, for their educational value; and, second, to bar the small percentage who actually cannot drive safely. All tests should be standardized and conducted under controlled conditions.

Conclusion

The potential value of improved examinations has been pointed out. Extension of their use is recommended.

While the present eyesight examinations are not believed to have

much correlation with tendencies to have or avoid accidents, this belief in no way minimizes the importance of certain examinations having to do with the way a driver understands, interprets, and responds to what he sees. Since the human being is able to compensate marvelously for a defect in one ability by the expansion of another, he should be studied as a unit. A list of suggestions along this line has been made.

Only 16 states have a drivers' license law and but 10 of these have a good one. While there is no question but that further research is required, it is felt that the greatest need today is to get standardized examinations more widely and thoroughly used.

Trachoma in the Native White Population of the United States

C. E. Rice, M.D., and Avery A. Drake, M.D.

TRACHOMA patients who are treated adequately do not become blind, although many suffer impaired vision. The large majority of trachoma patients either do not seek treatment at all, or do so only after their vision has been impaired

TRACHOMA, meaning roughness, is primarily a granular inflammation of the conjunctiva of the eyelid. It is differentiated from other conditions which produce granules or follicles of the conjunctiva principally by its chronic course and involvement of the cornea, usually early in the course of the disease.

At the present time trachoma is epidemic[1] in Egypt, China, Japan, India, Palestine, and Russia. It is endemic in Roumania, Czechoslovakia, Yugoslavia, Poland, Bulgaria, Italy and Spain. In the United States it is endemic in Missouri, Tennessee, Kentucky, Arkansas, southern Illinois and West Virginia. Sporadic cases are found in many other states.

From the time that the United States Public Health Service, in co-operation with certain state departments of health, entered upon a program aimed at eradication of trachoma, a large number of individuals with trachoma have been observed: in Kentucky, 9,087 from 1913 to 1933; in Tennessee, 3,653 from 1916 to 1933; in Missouri, 5,388 from 1923 to 1933; in Arkansas, 1,123 from 1922 to 1928; in West Virginia, 655 from 1915 to 1918. At the request of the Illinois State Board of Health, nine diagnostic clinics were held, at intervals, during 1930 and 1931 by the Public Health Service. These were held in southern Illinois where the disease is endemic. Of 858 individuals examined, 314 were found to have trachoma.

Rosenau[2] in his book, *Preventive Medicine and Hygiene*, states that trachoma is frequently encountered among the white population of some of our southern and midwestern states and that it is endemic in the poorer sections of all the large cities. This statement is contrary to our experience. Trachoma is very rare in our large cities today, but it is endemic in many rural sections of the states mentioned above.

The victim of trachoma has congested eyes, a feeling of roughness, as if something were scratching the eyeballs, sensitiveness to light, a watery discharge and, after a time, impaired vision. After many years the lids may become distorted (incurved) causing the lashes to rub the cornea.

On everting the lids of early cases of trachoma, the mucous membrane is seen to be highly inflamed and thickened; follicles are present in the thickened mucous membrane of both upper and lower lid. The small vessels seen in the healthy palpebral conjunctiva are absent. Trachomatous changes occur primarily in the conjunctiva of the eyelids. Such changes eventuate in scar tissue which may be seen even fifty years later.

Trachoma very early involves the cornea which should always be carefully studied. The earliest changes occur usually within three months and are manifested by cellular infiltration of the corneal tissue and usually vascular penetration of the cornea. This is known as "pannus" which is practically pathognomonic of trachoma.[3] Corneal ulcers may form in early life. We have seen severe trachomatous ulceration, with impending perforation of the cornea, in a female infant of 18 months.

Corneal involvement in trachoma should not be thought of as a complication but as an integral part of the disease in humans. It may continue after the conjunctival disease has been entirely arrested. There is a wide variation in the susceptibility of corneas to involvement, a variation which has never received adequate explanation. Corneal trachoma with the incident failure of sight renders the disease a problem in public health.

Trachoma probably originates exclusively from the secretions of another eye affected with the disease. As a rule, there is a history of close contact with infected individuals as in the case of large families living in contracted quarters and using common towels,

wash basins, etc. Under conditions of school life, spread of the disease is limited and it seems unwise to exclude trachomatous children from school, provided they are under treatment.

The disease usually has its beginning in childhood or early adult life, the infection coming from the parents or other members of the family or from a marital partner.

In view of the fact that trachoma is so prevalent among persons of low economic status, living under wretched, unhygienic conditions, it has been contended that trachoma may be a food deficiency disease.[4] Our observations lend no support to this view. When one considers that trachoma is widely prevalent among professional wrestlers, it does not seem likely that the food deficiency theory is well founded. Undernourishment is not particularly manifest in the trachoma cases in Missouri, Kentucky and Tennessee. An infestation with hookworm has never been seen in a Missouri case. Hookworm infestation, however, is quite prevalent among the Kentucky trachoma cases.[5]

In 1927 Noguchi[6] described an organism, *Bacterium granulosis*, which he believed to be the cause of trachoma. Other observers have often found this organism, but its etiologic relationship to the disease is still in question. The inclusion bodies of von Prowazek that are often seen in stained scrapings from the trachomatous conjunctiva have been reproduced artificially[7] by instilling certain bacteria and chemicals into a normal conjunctival sac. Friedenwald[8] states that these inclusion bodies are rarely seen in trachoma in this country. In a series of 230 cases intensively studied by Bengtson[9] at Rolla, Missouri, she found inclusion bodies in 45 per cent. It cannot be said, therefore, that the problem of etiology has been solved.

Trachoma is found in all age groups. This is in striking contrast with folliculosis, a disease resembling trachoma. Folliculosis occurs predominantly in young children; beyond the age of 14 it is seldom seen.

Since our work in Missouri was started, in 1923, we have surveyed over 5,000 cases. In this group of cases it is found that the males predominate. In three contiguous counties where intensive field work was done, 1,151 cases of trachoma were found, of which 60.4 per cent were males. It is possible that some cases in females were

missed, which would have been found by a more careful house to house search. However, the 1,151 cases mentioned were not selected in any way and can really be considered a fair random sample of the trachoma occurring in a rural area of Missouri of over 2,500 square miles, with a population of 51,000.

There is considerable variation in the severity of trachoma the world over, and even within the borders of our own country. Trachoma among the Chinese[10] probably does less damage than among the white population of Missouri and Arkansas. The number of blind eyes and entropions per 100 cases of the disease can be used as a measure of the virulence of trachoma. Studies have been made in five areas of this country based on such measurement. These areas, in the order of decreasing virulence, are[11]: Missouri, Arkansas, Kentucky, Tennessee and Georgia.

The diagnosis of trachoma must be made solely on the clinical signs. There is no difference histologically[12] between the follicle of trachoma and the follicle of benign folliculosis. The laboratory, therefore, offers no help in differential diagnosis. Statistics on trachoma emanating from states where trachoma is reportable are very untrustworthy, owing to the inability of many examiners to make a correct diagnosis. There are several conditions simulating trachoma, such as vernal catarrh, folliculosis and follicular conjunctivitis. The last two are often mistaken for trachoma.

A thickened and inflamed mucous membrane at the base of the follicle should make one suspicious of trachoma. The upper part of the cornea should be examined by focal illumination and high magnification. In true trachoma there will sooner or later be found infiltration and vascular invasion. There is no need for a hurried diagnosis. One should make frequent inspections of doubtful cases over a period of several weeks or the therapeutic test may be applied. Suspected cases may be placed on some mild astringent solution, such as 0.2 per cent zinc sulphate or 2 per cent mercurochrome, continued for six or eight weeks. Complete recovery would then definitely place the conjunctival inflammation in the category of a benign follicular disease. If, on the contrary, the condition has remained at a standstill or has grown worse, the health official should strongly suspect trachoma and call upon the eye specialists for confirmation of his suspicions.

In one locality, a large number of public school pupils showed conjunctival and palpebral congestion with the formation of follicles, giving rise to great concern among the local physicians, parents and teachers. The therapeutic test was applied by the school teachers themselves after being instructed by physicians.[13] Twice each day the affected pupils received instillations of zinc sulphate solution or 2 per cent mercurochrome. At the end of six weeks expert examination proved that nearly all had recovered.

Trachoma can produce blindness or near blindness very early in life. Among 5,000 odd cases observed in Missouri, one out of every seven or eight had vision reduced to 20/200 or less. Of these, approximately one-third were below the age of 40 years and about 10 per cent were below the age of 20 years. In Missouri there is found one trachoma blind pensioner to every 26 cases of trachoma.[14]

But there is a brighter side of the picture. Many individuals examined in field clinics and in the out-patient clinic at the hospital show the presence of scar tissue in the lid conjunctiva, the indubitable sign of a once active trachoma. Often there has been no treatment beyond home remedies; nevertheless, the disease has run its course, and recovery has ensued without damage to vision.

Missouri has a blind pension law which allows $25 a month to each blind citizen. On January 1, 1933, there were 3,885 blind pensioners. Of these, 761, or 19.5 per cent, were blind from trachoma. Trachoma is the greatest single cause of blindness in Missouri, and is costing $228,300 a year in blind pensions alone. Moreover, there is a great reservoir of citizens who are approaching blindness from this cause. With many of these we have never made contacts in the almost ten years of trachoma work in this state. From this reservoir there will come for several years additions to the state blind pension roll.

The program as carried out by the United States Public Health Service in co-operation with various state health departments is a threefold one, based on: (1) Case finding, which is accomplished largely by the trachoma field nurse; (2) education as to proper personal and family hygiene (this is accomplished by the trachoma field nurse in the home, and by the hospitalization of the individual patient); and (3) treatment of the active cases as given

at the hospital, the out-patient clinic at the hospital, and the field clinics held from time to time in various parts of the state.

The work in the field is mainly carried on by public health nurses who have been especially trained. The work of the trachoma field nurse plays a very important part in the program. She visits homes and schools and examines the eyes of those with whom she comes in contact, noting all cases suspected of trachoma. It has been found that school examinations alone do not give a true picture of the prevalence of trachoma in any one community, for the reason that the child with trachoma soon drops out of school. This has been found true repeatedly. The field nurse instructs trachoma families about personal and family hygiene, and gains their confidence and good will. One of her duties is to organize diagnostic and treatment clinics at which new cases are examined and advised to come in regularly for treatment or to enter the hospital. Operative clinics are held in schoolhouses, court houses, or churches which are converted into temporary hospitals by the installation of army cots. Here the patients who are operated upon are kept for one week. Often the women of the community are most helpful in preparing and serving meals. The field nurse keeps in touch with former hospital patients in her territory and, if they again require treatment, urges them either to go to the hospital or to come to the clinics. It is often difficult to secure the consent of parents to permit their children to go to the hospital, and repeated visits by the nurse may be necessary before the goal is reached.

MacCallan[15] in the early part of this century started the English campaign against trachoma in Egypt by establishing small temporary field hospitals. A somewhat similar plan was adopted by Surgeon John McMullen of the United States Public Health Service, when, in 1913, he inaugurated the campaign against trachoma. Today this plan is still followed and, in the heart of endemic areas, small temporary hospitals are established, partly supported by the interested state health department and partly by the United States Public Health Service. They are operated solely for the treatment of trachoma, and without charge to the patient for board, lodging and professional care. However, the patient is required to furnish his transportation to and from

the hospital, and to pay for the laundering of his personal clothing. In Kentucky, the Louisville and Nashville Railroad has for many years furnished free transportation for trachoma patients to and from the hospital.

The use of individual towels and soap is enforced, and the patient's hygienic habits are supervised. Thus, new standards of personal hygiene are developed and new ambitions are aroused; and on the return of the patient to his home, his family benefits from his newly acquired knowledge.

The number of drugs and other agents that have been used in the treatment of trachoma is legend. Only a few have proved useful and have stood the test of time. No specific treatment has ever been found. Nature heals trachoma by producing scar tissue in the eyelids, and man's most successful efforts to this end have been secured by the use of agents which, while not unduly traumatizing the eyes, stimulate the production of scar tissue in the subconjunctival tissue of the lids.

Our general routine treatment of trachoma at the hospitals is as follows: At 6.30 A. M. all patients' eyes are irrigated with a solution of 90 grams of boric acid powder and 30 grams of sodium chloride to 4 liters of water. At 9 A. M. all patients are examined and treated by one of the staff physicians. We usually use 2 per cent silver nitrate, copper sulphate stick, boric acid powder or 7 per cent trichloracetic acid in all cases of acute and subacute trachoma. After the use of one of these on the well everted lid the conjunctival sac is flooded with the irrigating solution. At 11:15 A. M. the irrigation is repeated, followed by drops of a solution of 120 grams of boric acid powder and 8 grams of zinc sulphate to 4 liters of water. This routine is repeated at 4:15 P. M.

There are several operations which we have found of value. Grattage is practised when the lids exhibit exuberant granulations. Under holocaine and novocaine anesthesia, the conjunctival surface is carefully scraped with a dull scalpel, followed by a brisk rubbing with a dry piece of gauze. Then 20 per cent silvol is instilled and ice water compresses are applied to the eyes for one-half to one hour. Post-operative treatment consists of frequent irrigations and the application of 20 per cent silvol four times daily, until the operative reaction has subsided and all slough has

disappeared from the lids. Then the medical treatment outlined above is begun.

Canthoplasty is another operation that we find extremely useful. It is indicated in eyes with narrowed palpebral apertures, in blepharospasm, frequently in corneal ulceration, and in sensitive eyes which are irritated by the scraping action of the roughened lids. Canthoplasty and grattage are frequently performed at the same time.

An operation for entropion is frequently necessary. We prefer a modified Ewing operation, in which the incision is through the conjunctiva and tarsus, to any type which involves incisions on the skin.

Excision of the tarsal cartilage has a useful place in the surgery of trachoma. We do not agree with the view that its removal is indicated because it harbors infection, and that consequently reinfection is prevented by this procedure. When the tarsus is concave and rough from cicatricial changes, it is best to get rid of it. Usually it is best to remove the overlying conjunctiva, but when that membrane is shrunken, it is wise to spare it as much as possible. Under these conditions we prefer a partial excision of the cartilage, as advocated by John Green.[16]

In cases where there are a few aberrant lashes which curve inward and continually rub the cornea, their destruction by the electric needle is indicated. This procedure is extremely useful in select cases, but should not be used as a substitute for an entropion operation.

The period of hospital residence averages 29 days. The cost per patient per day was $2.08 during 1932, at the Trachoma Hospital at Rolla. Approximately 23 per cent of all patients return to the hospital two or more times with recurrences of the disease.

Trachoma eradication work is now being carried on by the United States Public Health Service in co-operation with the state health departments of Georgia, Kentucky, Tennessee and Missouri. The trachoma work in Tennessee at present is carried on by a field unit of one physician and two nurses with headquarters in the small mountain town of Gainesboro. One nurse is almost constantly employed in searching for new cases of trachoma; the physician and one nurse hold treatment clinics at

regular weekly intervals in several nearby counties. Six hospital beds are available at Gainesboro for the more severe cases.

In Kentucky the trachoma field hospital is located at Richmond in a large colonial mansion owned by the Kentucky State Medical Society. It has been possible in that state to interest and train several county health officers in treating the milder cases of trachoma at regular weekly clinics.

Co-operation and encouragement have been given us by ophthalmologists, as it is realized that our program in no way infringes on the rights of the private practitioner. Many of our patients are sent or brought to us by their family physicians and many are referred by ophthalmologists.

The patient with trachoma needs general as well as special care, and nearly always he or she is handicapped by lack of money. If proper provisions for this care are not made, then the state is likely to have a helpless blind man or woman on its hands. Trachoma patients adequately treated do not go blind, though many suffer impaired vision in spite of all treatment. The large majority of trachoma patients either do not seek treatment at all, or do so only after their vision has been more or less impaired. Early treatment before the disease has gained a firm foothold, and before vision has become impaired, would save these patients untold misery and would cost the state and federal governments far less. It is thus seen how vitally necessary it is to uncover as many early trachoma cases as possible. To do this requires house-to-house visiting, often in remote and sparsely populated regions. This explains why field nurses are indispensable.

We wish to express our thanks to Dr. John Green of St. Louis for having read this paper and making many helpful suggestions.

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Reading Ability of Sight-Saving Class Pupils in Cleveland, Ohio

Olive S. Peck

MOST sight-saving class pupils, when given enough time, read comprehendingly within the range of their mental ability, regardless of eye defects

FOR some time teachers of sight-saving classes have hoped to have some definite basis for measuring the reading ability of their pupils. Since all reading tests were printed in small type, and because of the enormous amount of work involved in making copies of these tests, it was out of the question to do any testing except in individual cases. With the appearance of a large-type typewriter, which cuts a stencil, the problem of reproducing these tests was solved to a great extent.

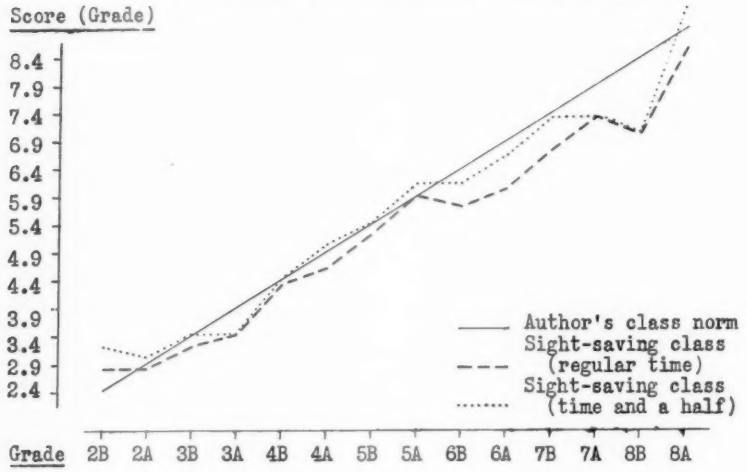
Since our aim in teaching sight-saving class children to read is to enable them to supplement their knowledge through the use of the printed page, a test of reading comprehension was selected as the best check on results. Reading as an occupation for leisure time is not encouraged. Because of the limited amount of large type material and the nature of the pupils' eye conditions, the reading training is intensive rather than extensive. The emphasis on reading is for information rather than for pleasure.

Permission was granted by the publishers of the Stanford Achievement Test in Reading to reproduce Form A of this test in large type for use in the Cleveland sight-saving classes. The test is in three parts: paragraph meaning, sentence meaning, and word meaning. In January, 1932, the test was given for the first time to every pupil in the sight-saving classes of Cleveland, in grades 2B through 9A. It was repeated in January, 1933. All of the testing was done by the writer in order to secure uniformity in administering the tests. (See Charts 1 and 2.)

Charts 1 and 2

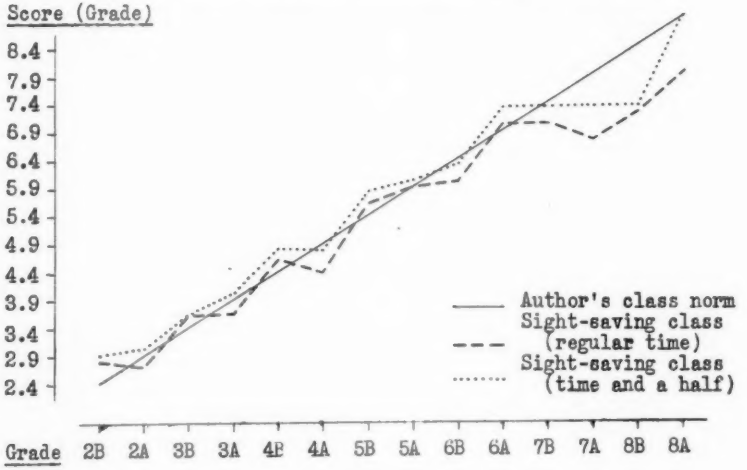
Total Reading Score - January, 1932

Median score of sight-saving class pupils—regular time and time and a half—compared with author's norm, by grade



Total Reading Score - January, 1933

Median score of sight-saving class pupils—regular time and time and a half—compared with author's norm, by grade



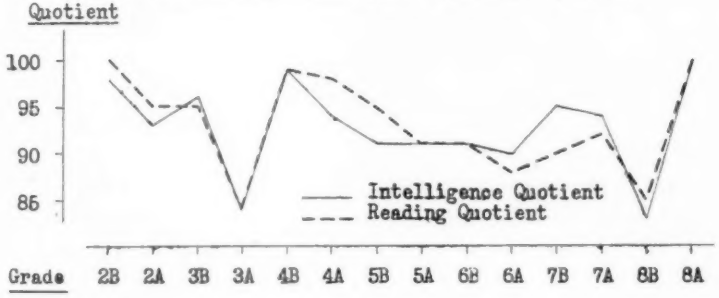
In giving the test, the question of time allowance was considered. It was decided to score the tests on the basis of the time allowed to children of regular grades and then to have a separate score on the basis of regular time plus one-half additional time. This longer time was considered to be enough so that each child could read as much as he was mentally capable of doing. The test covered twenty-four pages instead of the usual seven pages of ordinary size print. The question of extra time had to be decided rather arbitrarily as the exact amount of additional time necessary would depend upon the eye condition of the individual child. It was believed that the author of the test had allowed enough time to enable the child to work up to his mental level. Therefore, a liberal allowance of extra time was allowed the sight-saving class children so that they, too, could work up to their mental level.

The results of the tests are presented in the accompanying tables and charts. For the convenience of readers who may not be familiar with the technique of scoring such tests, it should be stated that in each of the tests the achievements are rated on a grade scale similar to the usual school grading system. According to the findings of the author of the test, pupils in grade 2B should show an average reading ability, early in January, of grade 2.4; those in grade 2A, of grade 2.9; those in 3B, of grade 3.4, etc. These standard findings, referred to as author's class norm in the charts, are made the basis of comparison for the findings of the tests as applied to sight-saving class pupils. The average used for

Chart 3

Reading Test and Intelligence Test - Regular Time - January, 1932

Median reading quotient of sight-saving class pupils, compared with median intelligence quotient, by grade



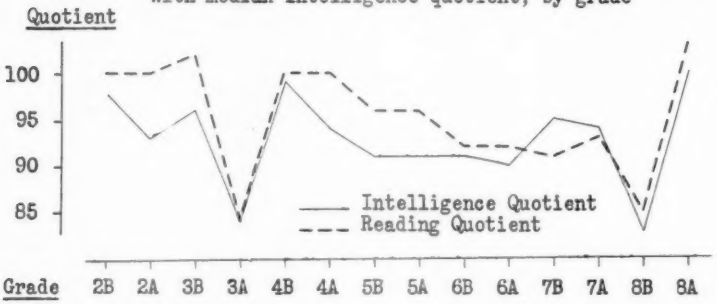
the sight-saving class pupils is the median (mid-score of all scores arranged in order of size) for each grade group.

Results of the entire reading test are shown both as grade scores and as reading quotients. The reading quotient, which is a

Charts 4 and 5

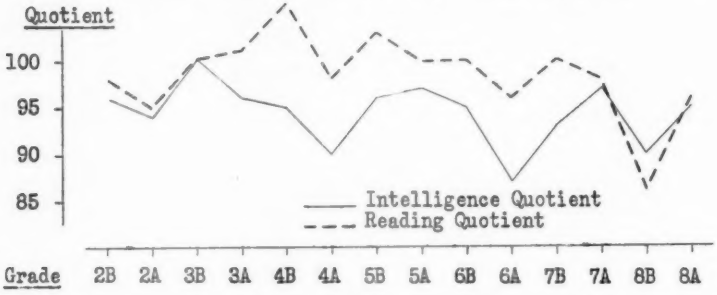
Reading Test and Intelligence Test - Time and a Half - January, 1932

Median reading quotient of sight-saving class pupils, compared with median intelligence quotient, by grade



Reading Test and Intelligence Test - Time and a Half - January, 1933

Median reading quotient of sight-saving class pupils, compared with median intelligence quotient, by grade



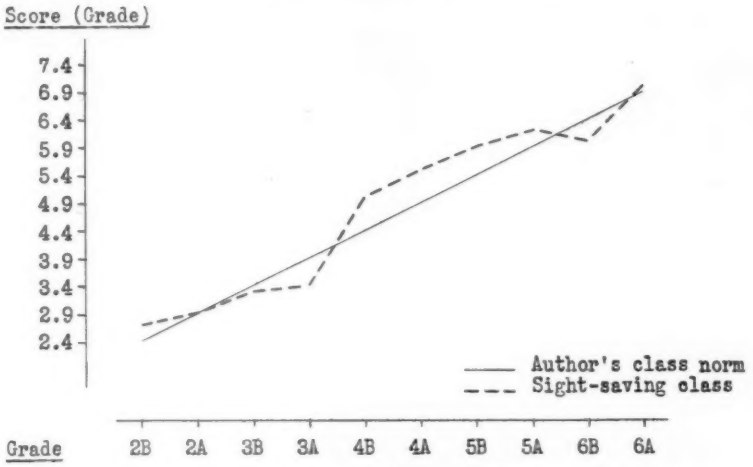
percentage ratio of actual achievement in months to standard achievement in months (norm), was computed for the purpose of making comparisons with intelligence quotients which are similarly arrived at. (See Tables I and II.)

The relation of the median intelligence quotient to the median reading quotient on both the regular time and extended time shows that teaching methods have been effective. (See Charts 3, 4, and 5.)

Charts 6 and 7

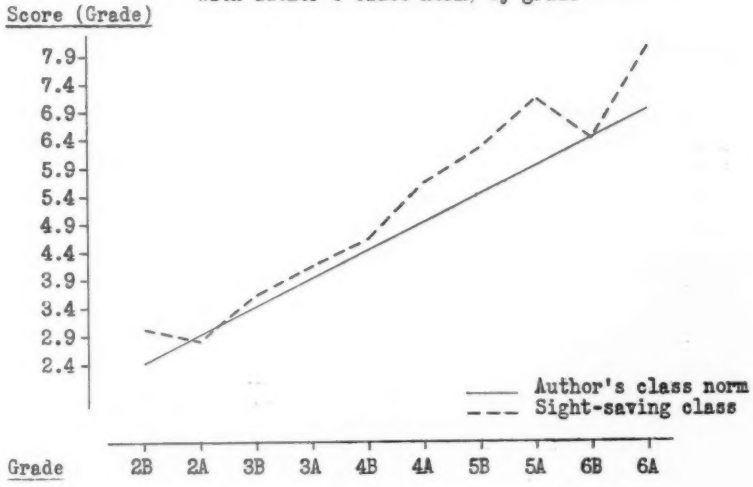
Paragraph Meaning Test - January, 1932

Median score of sight-saving class pupils, compared with author's class norm, by grade



Paragraph Meaning Test - January, 1933

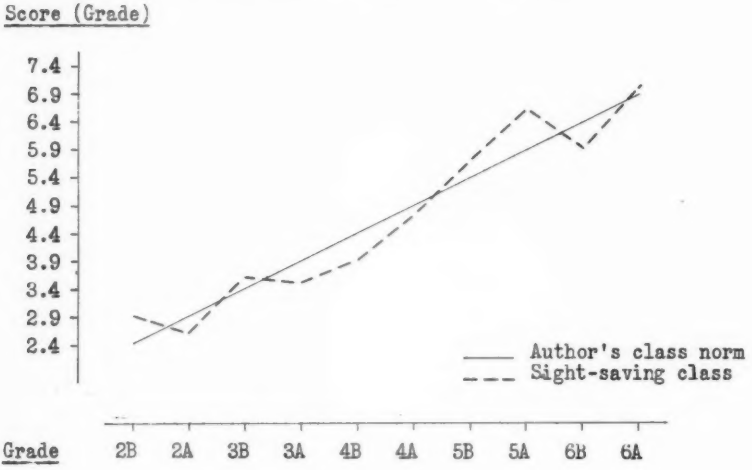
Median score of sight-saving class pupils, compared with author's class norm, by grade



Charts 8 and 9

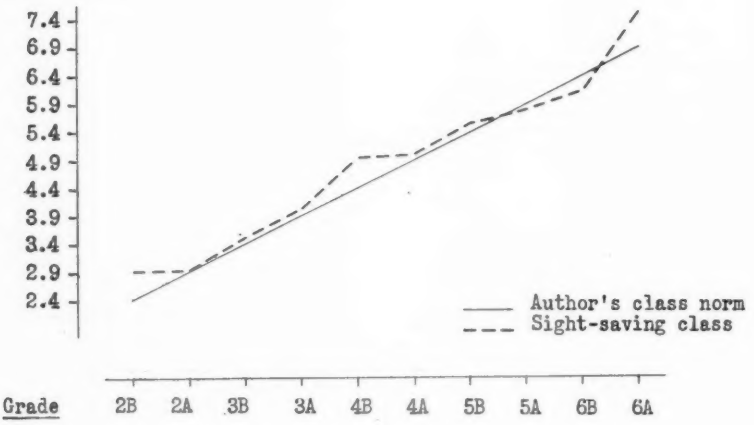
Sentence Meaning Test - January, 1932

Median score of sight-saving class pupils, compared with author's class norm, by grade



Sentence Meaning Test - January, 1933

Median score of sight-saving class pupils, compared with author's class norm, by grade

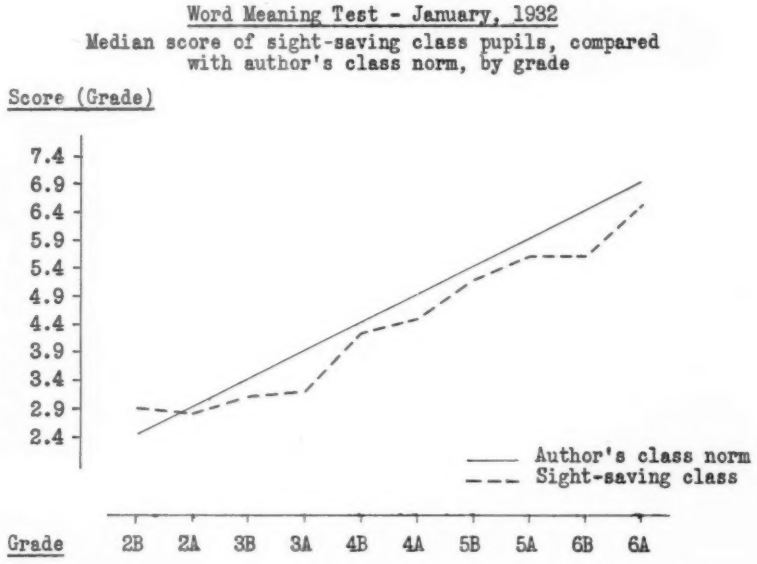


The intelligence quotients are based on Binet tests given to the individual child by a clinical psychologist.

It is interesting to note that, since time is known to be a great factor in seeing, these pupils, regardless of their eye defects, raised the level of their reading quotients in most grades, when extra time was given.

In the tests made in January, 1933, the first six grades were a

Chart 10



total of fifty months above the author's norm in paragraph meaning, fifteen months above in sentence meaning, and four months above in word meaning.* (See Charts.) Most of the individual grades were a little below the author's norm in word meaning.

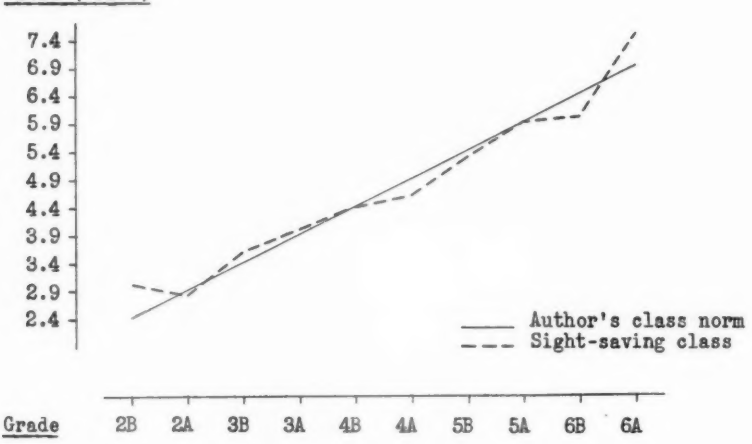
One year ago, when the test was given, the first six grades were a total of eleven months above the author's norm in paragraph meaning, two months above in sentence meaning, twenty-three months below in word meaning.

* The unitary score, or summarizing score, used for purposes of comparison is unconventional, but seems to be useful in this study.

Charts 11 and 12

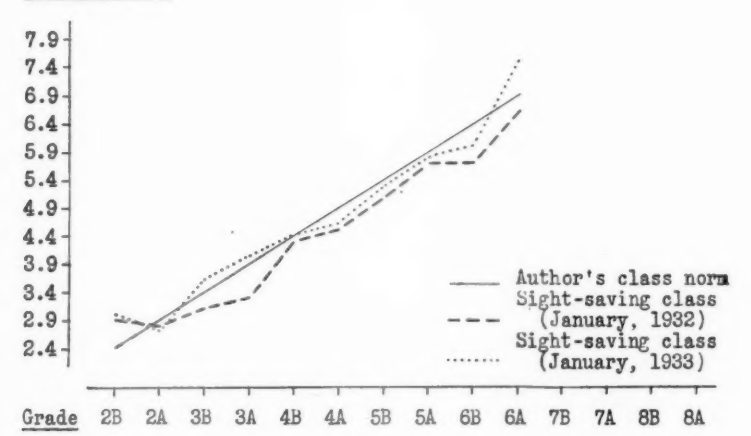
Word Meaning Test - January, 1933

Median score of sight-saving class pupils, compared with author's class norm, by grade



Word Meaning Test - January, 1932, and January, 1933

Median score of sight-saving class pupils—time and a half—compared with author's class norm, by grade



The results at that time showed that some of the grades were below the author's norm in word meaning, indicating a poor vocabulary. (See Chart 10.) This was thought to be due to:

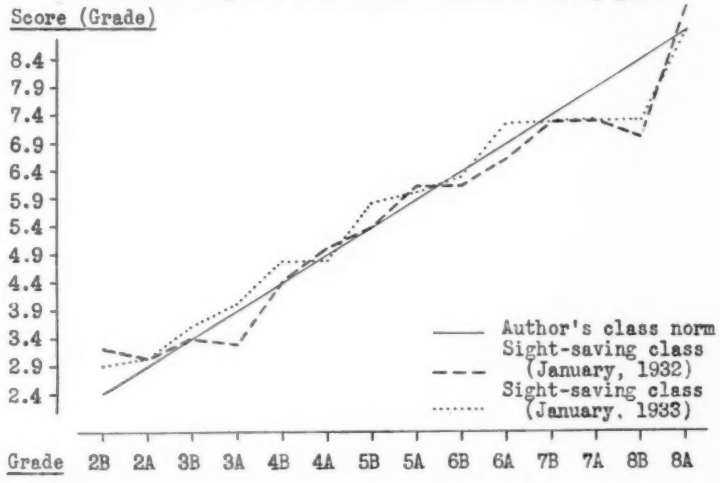
1. Lack of varied reading experience due to an eye difficulty.
2. Use of foreign language in the home.

A definite attempt toward vocabulary building was recommended. Since by the very nature of the eye difficulty, these

Chart 13

Total Reading Score - January, 1932, and January, 1933

Median score of sight-saving class pupils—time and a half—compared with author's class norm, by grade



children were limited in reading experience, an attempt to make compensation in the following ways was suggested:

1. Reading more to the children in school.
2. Paying special attention to oral language, reproducing stories they have heard.
3. Encouraging children to attend story hour groups at libraries, etc.
4. Encouraging parents to read aloud to the children at home.

The improvement secured by special attention to this phase of reading is shown by the graph which compares the median class standing in word meaning for 1932 and for 1933. (See Chart 12.)

An individual record of the results was filed for each child. On this card were placed the following data: chronological age, mental age, reading age, and class standing for the test, as a whole, for each year. A further record was made of the standing in the separate parts of the test—paragraph meaning, sentence meaning and word meaning. These records were kept both for regular

Table I

SUMMARY OF RESULTS OF READING TESTS GIVEN TO SIGHT-SAVING CLASS PUPILS, CLEVELAND, OHIO. JANUARY, 1932

Number pupils tested	Grade	Author's class norm (grade level)	Median score of sight-saving class pupils				
			Grade level		Intelligence quotient	Reading quotient	
			Regular time	Time and a half		Regular time	Time and a half
11	2B	2.4	2.8	3.2	98	100	100
16	2A	2.9	2.8	3.0	93	95	100
18	3B	3.4	3.2	3.4	96	95	102
11	3A	3.9	3.3	3.3	84	84	84
20	4B	4.4	4.3	4.4	99	99	100
16	4A	4.9	4.6	5.0	94	98	100
18	5B	5.4	5.2	5.4	91	95	96
13	5A	5.9	5.9	6.1	91	91	96
17	6B	6.4	5.7	6.1	91	91	92
12	6A	6.9	6.0	6.6	90	88	92
13	7B	7.4	6.7	7.3	95	90	91
18	7A	7.9	7.3	7.3	94	92	93
12	8B	8.4	7.0	7.0	83	85	85
9	8A	8.9	8.5	9.3	100	100	103
21	9B	9.4	8.7	8.8	97	96	97
9	9A	9.8	8.8	9.7	98	96	97

time and the extended time in order to determine the amount of gain in reading accomplishment resulting from the added time.

The record of each child was discussed in detail with the teacher. If the child was up to grade, no specific additional work needed to be undertaken in reading. The pupil who was below grade was the object of detailed study in the attempt to work out a method which would help to strengthen his reading. The number of months of reading progress for each child in the year's interval

between tests was of great interest and help to the teachers in planning a future reading program.

It is hoped that it will be possible, this year, to follow up this achievement test by giving diagnostic tests of oral reading to those pupils who were below grade, in an effort to determine the source of the reading difficulties which are not necessarily due to

Table II

SUMMARY OF RESULTS OF READING TESTS GIVEN TO SIGHT-SAVING CLASS PUPILS, CLEVELAND, OHIO. JANUARY, 1933

Number pupils tested	Grade	Author's class norm (grade level)	Median score of sight-saving class pupils			
			Grade level		Intelligence quotient	Reading quotient
			Regular time	Time and a half		Time and a half
15	2B	2.4	2.8	2.9	96	98
14	2A	2.9	2.7	3.0	94	95
15	3B	3.4	3.6	3.6	100	100
22	3A	3.9	3.7	4.0	96	101
13	4B	4.4	4.6	4.8	95	106
18	4A	4.9	4.4	4.8	90	98
19	5B	5.4	5.6	5.8	96	103
15	5A	5.9	5.9	6.0	97	100
14	6B	6.4	6.0	6.3	95	100
12	6A	6.9	7.0	7.3	87	96
12	7B	7.4	7.0	7.3	93	100
11	7A	7.9	6.7	7.3	97	98
12	8B	8.4	7.2	7.3	90	86
17	8A	8.9	7.9	8.9	95	96
12	9B	9.4	9.0	9.0	95	100
6	9A	9.8	9.3	9.5	103	104

defective sight, but to incorrect reading habits which may prove to be remediable under proper treatment. Such an analysis of reading difficulties is, of course, too detailed to be used for children whose reading is already satisfactory.

Since it has been found that in regular classes some of the frequent causes of slow reading are lip movement, inability to phrase properly, short eye span, and irregular eye movements, it might be expected that, by nature of the eye defects, nearly every

sight-saving class child would be a slower reader because every unfavorable factor except lip movement would be contributing to produce a slower rate of reading.

The results of these tests show that most of the sight-saving class pupils, when given enough time, read comprehendingly within the range of their mental ability, regardless of the eye defect. Since many sight-saving class pupils are failures in reading in the regular grades before being referred to the sight-saving classes, these results are doubtless due, in large measure, to the use of type suited to the eye condition, to careful reading instruction definitely adapted to the needs of the individual child, and to scientifically planned lighting conditions.

Editorials

Eye Injuries in Automobile Accidents

THERE could be nothing more serious and more dramatic than the sudden loss of sight through accident.

During the twenty-five years of organized work for the prevention of blindness, there has been a steady decrease in blindness from eye diseases of all kinds; yet blindness caused by accidents has been steadily increasing. This is due partly to the rapid mechanization of our industrial life.

It may be stated as a general principle that wherever there are accidents, there are eye hazards. Particularly is this true where such accidents are the results of explosions and of flying particles. Automobile accidents of all kinds result in a fairly large percentage of eye injuries, and many of these eye injuries are produced by flying particles of glass. Unfortunately, no records have been kept on a large scale showing the exact percentage of these injuries. From conferences with numerous eye physicians and safety engineers, we know that the aggregate of such injuries is sufficiently large to merit careful consideration and the elimination of the cause, if possible.

The National Society for the Prevention of Blindness co-operates with all agencies interested in the reduction of eye hazards, since a reduction of general accidents will result in a reduction of eye tragedies. Several years ago, the Society collected reports of 4,456 eye injuries from accidents. Of these, 381, or 8.5 per cent, were injuries resulting from automobile accidents, most of them caused by shatterable glass used in the cars.

Estimates of the frequency of serious injuries resulting from the shattering of glass in automobile accidents vary up to 45 per cent of all injuries from motor vehicle accidents. What proportion of these injuries were eye injuries it is difficult to ascertain. We believe it is safe to assume, however, that a very large proportion of these injuries involved eye injuries because all windows of automobiles are naturally on a level with the eye, and shattered glass

would in most instances fly against the face of drivers and passengers.

Within the past month, three states—New York, Nebraska, and Pennsylvania—have enacted legislation which provides for the installation of non-shatterable glass in all motor vehicles in the near future. There is no question but that the furtherance of this action throughout all the states would result in a reduction of death and serious injury from automobile collisions, and that it would also bring about a marked reduction in eye accidents.

Illinois Triumphs

We congratulate Illinois, and particularly the Illinois Society for the Prevention of Blindness, on their new law to reduce ophthalmia neonatorum by making obligatory the use of a prophylactic in the eyes of the newborn. Less than two years ago, progressive citizens of Illinois suffered a disheartening blow when such a bill was vetoed. But, undaunted, everyone continued to work toward resubmitting it; and on April 20 Governor Horner signed the bill linking his state to the more progressive states—30 of them—in fighting blindness from this source.

All told, 45 states of the Union have laws to aid prevention of infant blindness. In 14 states, however, the laws are not complete. Three states have no law compelling prophylaxis to save their citizens from such needless tragedy. Here is work to be done, and good citizens may find a reward for their labors, even as happened in Illinois.

The Forum

THIS section is reserved for informal papers, discussions, questions and answers, and occasional pertinent quotations from other publications. We offer to publish letters or excerpts of general interest, assuming no responsibility for the opinions expressed therein. Individual questions are turned over to consultants in the particular field. Every communication must contain the writer's name and address, but these are omitted on request.

Cross-Eyed Children—What to Do for Them and When

What the real underlying cause of a "squint" is we do not know. Does the eye squint because of poor vision or does the poor vision follow the squint? Which was first, the chicken or the egg? There is no doubt at all that the eye which squints gradually and surely loses its good vision. A squinting eye is not taking an active part in seeing, especially at the near point—that is, reading and writing.

At the present time the ophthalmologist cannot offer any satisfactory explanation for this most serious ocular defect. There may be a certain number of eyes that have defective vision at the time of birth and in these cases the squint will develop very early. Such a case may show a well-marked convergent squint, commonly called "cross-eye," before the tenth month. Every oculist has seen these cases, and in some of these children the squint may be noticed only on occasions and during the rest of the time both eyes may be perfectly straight.

There is another group of children in which the squint does not appear until the third, fifth, seventh or tenth year, and when these cases come to us for examination and refraction the vision in the squinting eye is usually 20/200 and is unimproved with any glass.

It is possible that the vision in these eyes was never normal but

the squint uncorrected with glasses for some years may have caused the gradual reduction of the vision.

This is written to make a direct appeal to the family physician, the nurse or the welfare worker because they are often the first ones that the mother turns to for advice.

The oculist too often hears from the mother that she has been told to wait until the child is eight or ten years of age before getting glasses. What she should be told is, take your child to your oculist today and have the child's eyes tested and fitted for glasses.

The glasses must be worn constantly, and in nearly every case the squint will disappear and the strain will be taken off the other eye. In a certain number of cases the vision in the squinting eye will improve.

Various forms of eye exercises have been devised for the squinting eye, having in mind the improvement of the vision and the development of the fusion center, that is, the brain center which causes the two eyes to move together and focus on the same object.

In the great majority of these cases no operative procedure is necessary. The point to be especially emphasized is the securing of the proper glasses the minute the squint appears, no matter how young the child may be. I have prescribed glasses any number of times for children under twelve months of age and they are worn just as readily by the child as any article of clothing.

In the public schools in the City of New York there are 50,000 cases of convergent strabismus, or cross-eye. How many are there in Nassau County? We know there is a great number of cross-eyed children in our schools who do not have the proper glasses.

WALTER BAER WEIDLER, M.D.—Reprinted, with permission, from the *Nassau Medical News*, February, 1933.

Carrying on School After an Earthquake

The date—March 10, 1933. The time—5:55 P. M. A rumble, a swaying, then suddenly—jerkings, twistings, crashings, rocking, quivers—and calm. All in eleven terrifying and stunning seconds! Eleven seconds! But the effects will be felt, no doubt, by the schools for eleven years.

Our apartment house, being earthquake proof, withstood the shock. Only a few chimneys were down and some windows broken in our block. One is apt to judge a disaster by the harm done to one personally and to one's own little neighborhood. Therefore we did not realize the full force of the quake nor the significance to us and the influence on our futures, until we began hearing rumors. We decided to see for ourselves what really had happened.

Prepared, as we thought we were, by reports of the damage, it was still a terrible shock to find those beautiful school buildings we had left only a few hours before, in their present condition. Even yet we cannot fully realize that March 10 was our last day of school in them. The building in which I taught is still standing, but no children are permitted to enter it. Condemned schools are enclosed by fences, and closed until provision is made to demolish or reinforce them.

After two weeks of vacation, declared by the Board of Education, and our usual Easter vacation, we had recovered enough to begin school. As the buildings could not be used, classes were held under tents, beach umbrellas, canvas covers, or trees, for shade. Each teacher gathered her children in small groups, some in the morning, the rest in the afternoon. Each group remained for one hour. The local paper published home lessons and advice to parents for home study. Radio programs for junior high school pupils were broadcast, using the different subjects for lessons. Children brought their home work to be checked and received the necessary help from the teacher. Assignments for the next day's lessons, to be studied during the home hours, were then made.

Men and materials soon arrived on the grounds and the bungalows began taking shape with magical speed. We took our groups into the bungalows for hour sessions until everything was in readiness for full sessions.

Three weeks of vacation, two more in the open, and teachers and pupils alike had acquired a healthy tan. All were enthusiastic and eager for school to begin in the new quarters.

Two teachers were assigned to each bungalow. One teacher from 8 to 12:10, and the other from 12:20 to 4:30. There are still some home work and radio lessons to supplement this program.

Our class shares the bungalow with the kindergarten. This gives us plenty of room to move our "roving chairs"—as some one humorously calls them. We have the afternoon session.

When the sight-saving class children are enrolled in the morning session grades, they come then for their oral work, which the regular teachers have considerately placed at the end of their program. They go home for lunch and come back at one o'clock for the special work. Thus their hours are conveniently arranged so they will attend the same length of time as the regular grade pupils. With the approval of the parents, they may stay for extra work in typing if they wish—and they all do.

The junior high classes come in the afternoon for their regular as well as special work. There are ten in junior high school class and one 4B braille reader in that group. We have fifteen enrolled in our elementary section, in eight divisions. Our groups are in different schools.

To the "sight saver," the lighting conditions are not ideal. But many classes must be held in tents and under much more unfavorable conditions; so we are grateful for what is allotted to us and are carrying on under much more favorable circumstances, and with conditions more normal, than we thought possible on March 11.

School will continue till July 1. This gives us the usual number of days' attendance required in this state for promotion and state aid.

So we will close our eventful year with a feeling of "well done"; since what we lost in hours of attendance in the school room has been more than balanced by what we all gained in courage, consideration, helpfulness and good sportsmanship.

JESSIE I. CAMPBELL, Sight-Saving Class
Teacher, Long Beach, Calif.

The American Board for Ophthalmic Examinations

Just what the American Board for Ophthalmic Examinations is and what it does are tersely described by Dr. Walter R. Parker in a recent issue of *Archives of Ophthalmology*, in which he discusses the general subject of "The Teaching of Ophthalmology in This Country." For the benefit of those of us who would like to know some of the outstanding details, we are quoting Dr. Parker.

"I should be remiss if I did not refer to the activities of the American Board for Ophthalmic Examinations. The object of the Board is to examine candidates and to certify as to their fitness to practice ophthalmology, and to act in an advisory capacity when requested. There are nine members on the Board, three from each of the national societies, the American Ophthalmological Society, the Section on Ophthalmology of the American Medical Association, and the Academy of Ophthalmology and Oto-Laryngology. Each society elects one member annually to serve for a term of three years . . .

"The importance of the certificate to the holder has been greatly enhanced by the fact that not only the national societies have made the certificate part of their requirements for membership, but several hospitals require it for positions on the staff. The efforts of the Board have only an indirect effect on the teaching of ophthalmology. The members of the committee recommend that two years be the minimum for training. Of the two years, the first should be devoted to systematic work divided between fundamental and clinical subjects; the second should be spent as an interne in a hospital, as assistant in a well-organized eye clinic, or as a private assistant in the service of a competent ophthalmologist. A list of the subjects to be included in the fundamental and clinical courses is recommended by the Board, but no course of instruction is attempted. In addition to the two years recommended for training, a third year in the practice of ophthalmology, or as an assistant, is required before the candidate shall be eligible for examination by the Board. Each candidate is required to submit case records and to show an intimate knowledge of the following subjects: (1) external diseases of the eye; (2) ophthalmoscopy; (3) pathology and anatomy; (4) errors of refraction; (5) ocular muscles; (6) perimetry; (7) relation of eye conditions to general disease; (8) therapeutics and operations."

Note and Comment

Silver Anniversary of the National Society for the Prevention of Blindness.—Marking its twenty-fifth year of effort to save sight, the National Society opened its offices to members and friends at a tea on May 24. The occasion was particularly happy in that it presented an opportunity for the meeting of old and new friends. Greetings were received from many people in allied fields who have contributed to the progress of prevention of blindness. Members of the Board of Directors and their wives, assisted by the staff, welcomed the guests. Many congratulatory messages were received, from which we quote:

Mr. Stephen Early, Secretary to President Roosevelt:

> "Despite the almost crushing pressure under which the President is working these days in connection with the national and international problems which require his attention day and night, he has asked me to extend his congratulations to the National Society for the Prevention of Blindness on the splendid work already accomplished and his best wishes for extension of these benefits in the future to those now in need."

Prof. F. de Lapersonne, President, International Association for Prevention of Blindness:

> "Heartiest congratulations to the American National Society and warmest wishes for a larger development of its noble philanthropic work."

Miss Helen Keller:

> "I greet you and your co-workers on the twenty-fifth anniversary of the National Society for the Prevention of Blindness. It is one of the pleasant satisfactions of my life to look back over the history of the Society, and to feel that I have had a small part in its beneficent activities.
>
> "For a quarter of a century the organization has stood a noble citadel against ignorance which plunges human beings into endless night. The good it has wrought is so positive, so undeniable, so beautiful in helpfulness that merely to speak of it on this occasion sets our hearts beating faster, and our

minds glowing with forward-looking hope for a day when there shall be no preventable blindness in the world! Wholeheartedly I join you in a vigorous and victorious campaign to preserve God's gift of light in human eyes."

Mrs. Franklin D. Roosevelt:

"Sorry I cannot be present Wednesday, May 24, to commemorate the twenty-fifth anniversary of the founding of your organization. Think you are doing splendid work and send very best wishes for continued success. Many regrets that I cannot be with you."

Miss Lillian D. Wald:

"I recall with pride and great satisfaction the privilege of having been associated with the valiant group who saw the opportunity and the privilege of organizing this Society. I am sure all who are interested would desire that future children will be protected from this great handicap to a complete life, and that the Society will be able to retire eventually with all the objectives realized."

Dr. William F. Snow, President, National Health Council:

"You will receive letters on this twenty-fifth anniversary from each of the member agencies of the National Health Council. But, as president, I want to add a special note of felicitation and appreciation of the Society's statesmanship and understanding teamwork in promoting conservation of vision as a part of rather than separate from health conservation as a whole. Never has the Society forgotten the mind and body behind the eye. This is significant in the history of special interest agencies."

Miss Marguerite A. Wales, General Director of Nurses, Henry Street Visiting Nurse Service of New York:

"The Visiting Nurse Service of New York City is pleased to send its warmest congratulations to another organization in the field of public health, the National Society for the Prevention of Blindness, which may be justly proud of its accomplishment in saving sight since its small beginning twenty-five years ago. All of us who know of the Society's development from a campaign against blindness among infants in New York State to a nation-wide attack on all preventable causes of blindness, have the highest admiration for its work."

Mr. William H. Cameron, Managing Director, National Safety Council:

> "The National Society for the Prevention of Blindness has a record of achievement which deserves recognition by every individual and institution interested in human welfare. The National Safety Council has long been happy to co-operate in your constructive national effort to preserve that precious asset of eyesight which is so vital to the normal functioning of life. This co-operation has been particularly active in American industry and measurable results have been obtained that should furnish inspiration for a continued and expanded program."

Mr. Robert I. Bramhall, Director, Department of Education, Division of the Blind, Massachusetts:

> "Massachusetts sends its congratulations to the National Society upon the completion of twenty-five years of pioneer service in the prevention of blindness and conservation of vision. As a result of your activities untold numbers have been saved from needless blindness while many others have been able to save their remaining sight."

The Fourteenth Concilium Ophthalmologicum.—For the first time in the history of ophthalmological congresses, preventive measures occupied a prominent place on the program of the Fourteenth Ophthalmological Congress held at Madrid, Spain, April 17 and 18, 1933.

The morning of the first day was turned over to the International Association for Prevention of Blindness. In the absence of Prof. de Lapersonne, whose health prevented him from attending the Congress, the session was presided over by the vice-president, Dr. Park Lewis. The annual address by Prof. de Lapersonne was a report on the progress of the international work during the past year, read by Dr. Coutela.

An important paper was presented by the president of the Congress, Prof. Marquez, of Spain, on the "Necessity of a Rational Classification of the Causes of Blindness." An interesting discussion followed and a committee was appointed to consider the standardization of blindness from a professional viewpoint and present a formalized report at the next Congress. The committee

chosen were Doctors de Lapersonne, Park Lewis, Bishop Harman, Maziny Bey, Marx and Marquez.

Reports were presented as to the formation of national societies for the prevention of blindness from France, United States, Belgium, Austria, Egypt, Holland, Brazil, Bulgaria, Spain, Hungary, Poland, Portugal, Switzerland, and Germany, in all of which preventive movements had made great progress.

Additional Material on Trachoma.—Those who followed the intensive research work on trachoma of the late Noguchi will be interested to hear of the publications by Dr. Peter K. Olitsky, Dr. Jerome T. Syverton and Joseph R. Tyler on extension of this work, which is being carried on at the Rockefeller Institute for Medical Research. The *Journals of Experimental Medicine* for February and May contain discussions of these investigations under the title, "Studies on the Etiology of Spontaneous Conjunctival Folliculosis of Monkeys," Part I. Transmission and Filtration Experiments, and Part II. Bacteriological Experiments. Previous to that, *Science* for January 6 contained an article on "Induction of Experimental Granular Conjunctivitis by Direct Inoculation of Trachomatous Tissue." All of this material has been reprinted and makes a valuable addition to the literature on the etiology of trachoma.

Illinois Passes Ophthalmia Neonatorum Bill.—When, two years ago, the bill requiring that all newborn babies have prophylactic treatment for the prevention of babies' sore eyes was vetoed by the governor, work for its passage was renewed by the Illinois Society for the Prevention of Blindness and the other organizations interested in reducing blindness in the state. On April 20 of this year the bill was signed by Governor Horner, who refuted its alleged unconstitutionality on the grounds that prophylaxis is an act of sanitation, not of compulsory medication. Congratulations are being extended to those who worked so tirelessly to bring about its passage.

National Eye Service in England.—Patients of limited means now have opportunity to obtain expert eye service under the direction of the National Ophthalmic Treatment Board in England.

Formerly, the only services available to this economic group were out-patient departments in hospitals or sight-testing opticians, the English equivalent of optometrists. That this new type of service is of definite benefit to the patients is seen in statistics of 120 persons using this service: two had previously been seen as private patients but would have been financially unable to return except under the new service; one might have been able to pay a $5 fee; the other 117 would have gone to hospitals or to sight-testing opticians. Six of the patients were subsequently admitted to hospitals, and 80 needed treatment in addition to prescription of glasses. Had they gone to opticians, they would not have had the medical care necessary to prevent further loss of vision.

Dr. Wilder Honored.—The Eye, Ear, Nose and Throat Section of the Illinois State Medical Society held its annual meeting in honor of Dr. William H. Wilder, dean of Illinois ophthalmologists. Personal tributes were paid to his influence as a teacher, a physician, and as moving force in the founding of the American Board for Ophthalmic Examinations; and a gift was presented to him as a reminder of the meeting in his honor.

Who Is Our Brother's Keeper?—"A superintendent of one of the local hospitals 'phoned our organization that a five-day-old baby suffering from a positive eye infection had been sent home with its mother, and unless funds could be secured to employ a trained nurse, day and night, for three days, the child faced a life of blindness. Seven organizations were contacted in trying to get the proper authorities to assume this responsibility. When we realized it was impossible to secure assistance, the Toledo Society for the Blind agreed to pay the hospital for three days' nursing care in order to save the eyes. Although our check from the Community Chest has been only $37.50 the past two months, we place the value of eyesight far more than $36, the cost of the two nurses for three days."—Excerpt from the monthly report of the Toledo Society for the Blind, Toledo, Ohio.

The fine and generous response of the Toledo Society for the Blind in aiding a helpless child and preventing its ultimate blindness is to be heartily commended. Yet, in the midst of approval and admiration, we cannot but wonder at the seven organizations,

as well as the hospital in which the child first saw light, which were so wound up in official red tape that, for lack of a few dollars, they would have shared in destroying the sight of a little child. We raise the question: To whom does the ultimate responsibility belong?

Eyes—Their Insurance Value.—The loss of two eyes is not just twice the loss of one eye, protests Dr. George Lindsay Johnson, in the April *Archives of Ophthalmology*. Although that is how the compensation is figured by insurance companies in Great Britain and some of her colonies, a better understanding of the difference between the loss of one eye and the loss of both would bring about more intelligent handling of compensation. The loss of one eye must be considered in relation to the occupation; the loss of both might well be compensated by an annuity of half the wage for life. Ophthalmologists realize these facts; the law should recognize them.

Visual Performance Varies Under Different Daylight Illumination Values.—Using three different tests, K. Y. Tang reports, in the April issue of the *Transactions of the Illuminating Engineering Society*, that visual performance is greatly increased with increased daylight illumination. While many occupations require only a short visual span, with long intervals of manual and body activity, the speeding up of visual tasks through improved lighting has definite effects in industry; furthermore, the recognized psychological influence of increased daylight has a tonic effect upon production.

Color Blindness a Definite Handicap.—Although the difficulties which face the color blind in the ordinary course of life are negligible, among a group of seventy junior medical students the nine who were to some degree color blind met real difficulties. Faced with simple diagnostic problems, which depended upon an accurate color sense for solution, they failed to identify the organisms. Obviously, color blindness is an unsurmountable handicap in diagnostic and laboratory work, although these students, having a good discrimination for brightness, would do well in the field of roentgenology, conclude Dr. Leandro M. Tocantins and Dr.

Harold W. Jones, in a recent article in the *American Journal of the Medical Sciences.*

Prevention of Blindness in Iowa.—From the records of blindness compiled by the Iowa Commission for the Blind, cataracts have been found to be the greatest cause of blindness in that state. Glaucoma, trachoma and optic atrophy follow in importance. The legislature has voted to increase the number of venereal disease clinics in the state, a step, it is felt, which will materially reduce the amount of blindness from optic atrophy. Although Iowa has a law demanding that a prophylactic (silver nitrate) be used in the eyes of all newborn infants, seven children lost their sight this year from ophthalmia neonatorum. It is reasoned that if the silver nitrate ampules which the state distributes free of charge were used uniformly, there would be no danger of midwives or attendants at birth using the wrong prophylactic, or one that had lost its effectiveness. Protection of the eyes of school children is an important part of the efforts of the department for prevention of blindness, according to the 1932 annual report of the Iowa Commission for the Blind, and preschool vision testing has been demonstrated in many centers of the state.

Sight-Saving Classes Considered in South Africa.—The problem of the partially sighted child has been taken under consideration by the South African National Council for the Blind, according to a note in *Child Welfare—Kindersorg.* Quoting Dr. L. van Schalkwyk, organizing inspector of Union Education, it says: "The South African National Council for the Blind has focused public attention on the problem, and those authorities which have been approached have expressed appreciation of the problem and a desire to make some provision, in the nature of an experiment, to meet the existing needs for a sight-saving class."

Hand Slit-Lamp.—The slit-lamp has proved beyond doubt its usefulness in obtaining a deep view of the eyegrounds; for the examination of children and patients confined to bed, the hand slit-lamp will prove a valuable supplement to the larger apparatus. Dr. N. Bishop Harman describes the hand lamp in the March 25 issue of the *Lancet.*

Conservation of Vision—An Interlocking Public Function.—The prevention of blindness and the conservation of sight are a public service which is undertaken by varied departments. The Missouri Commission for the Blind, in its biennial report covering the years 1931 and 1932, traces its activities in the prevention of blindness through the avenues of public education: diagnostic clinics were held in co-operation with local agencies; vision testing demonstrations were given before teachers and nurses; special educational facilities were recommended for partially sighted children in districts having no sight-saving class; the Commission's films on prevention of blindness, its material and publications, were widely shown to teaching, professional, and lay groups throughout the state.

The two-year report of the Board of Education of the Blind of Connecticut shows a different approach to the problems of conservation of vision. In its rôle as educator of the blind, the Board has available statistics on causes of blindness in the state, upon which it may base its educational project for the prevention of blindness. Trachoma and syphilis are two important preventable causes of blindness on which efforts may be expanded. As conservor of sight, the Board assisted the city of Bridgeport in a survey of children with visual handicaps, finding those for whom a sight-saving education would be advantageous.

The annual report of the Board of Health of the city of Chicago shows a more direct dealing with the conservation of sight. To it come the first reports of cases of ophthalmia neonatorum; school and preschool vision testing are done under its supervision, and the reporting of correction of defects and the decision for entry into sight-saving classes lie in its hands. Other general health activities serve as indirect agents in conserving the city's sight.

New Instrument to Aid Prophylaxis Technique.—To overcome the difficulty sometimes encountered in trying to separate the eyelids of the newborn baby, Dr. Mario A. Castallo has designed an instrument which will gently but firmly separate the eyelids for the instillation of prophylactic drops. This instrument is described and illustrated in the March issue of the *American Journal of Obstetrics and Gynecology*.

Compensation Costs Diminish Under Eye Care.—After the California Wire Cloth Company had made and acted upon an illumination survey of its plant and a visual estimate of its employees, it found that the cost of compensation had fallen from $7 per man per year to $1.96. The results of the eye examination brought to light certain interesting facts: although over 96 per cent of the men had vision better than 20/40, 78.75 per cent showed susceptibility to accommodative fatigue; it was found that 53.75 per cent of the men showed a reduced field of color perception below 20 degrees, representing a serious accident hazard. Corrective lenses were prescribed to lessen the working fatigue, and further safety measures were taken in transferring men with visual defects to positions compatible with their visual ability. For full benefit, S. C. Pohlman, vice-president of the company, recommends adequate employee records and periodic follow-up of eye examinations.

Lighting Engineers Study Wall Paints as Aid to Lighting.—Although it has long been agreed by lighting engineers and others interested in lighting problems that the reflectivity of walls and ceilings may definitely affect the amount of illumination in a room, a recent study by D. L. Gamble, reported in the April *Transactions of the Illuminating Engineering Society*, investigates the subject experimentally. Using in sample rooms various kinds of wall paints in current use—magnesium oxide, white wall paint, mill white gloss, yellow, green, gray and pink tinted paints, and metallic paint and black diffusing paper—in combinations with direct, indirect and natural illumination, it was found that the illumination in foot-candles from the reflected surfaces was greater for the magnesium oxide than for other wall finishes; that while the light-reflecting value of flat white wall paint is greater than that of mill white gloss, the diffusing quality of the latter is so much greater that little loss is found. In general, both direct artificial and natural lighting are to a very appreciable degree dependent upon the reflection characteristics of the walls.

A Rural Public Health Experiment in China.—The urgent need for medical relief in rural centers in China has led to efforts to correct this lack. The report of the "Ting Hsien Experiment," given in the April *Quarterly Bulletin* of the Milbank Memorial Fund,

demonstrates the possibilities of organized scientific medicine applied to a rural community. Lack of knowledge of hygienic rules, slow and laborious means of travel and communication, and sparsity of trained medical workers and centers have caused widespread disease. Particularly interesting is the information on the extent of eye disease and the steps now being taken to prevent the accompanying visual impairment. Ting Hsien covers an area of about 44 square miles; the total population of its 61 villages is 44,190; the average annual income per capita is between $6 and $7. Fifty-six per cent of the children in the primary schools were infected with trachoma. After the organization of trained health workers in the villages and the allocation of physicians to the 31 villages without medical aid, 51.3 per cent corrections were made for the children with trachoma and 50.8 per cent of the cases were practically cured. Further education in prevention of eye disease was given in the health lectures at the People's Schools, which were attended by adults. The report shows that only organized community efforts will produce an efficient and far-reaching machinery for solving fundamental problems in health as well as in other phases of life.

Dominant Side of Reading.—Another firm belief began to topple when a study at Columbia University showed that, of 4,400 readers of newspapers in subways and waiting rooms, three-quarters of the number look first to the left in opening their newspapers and only a quarter looked first to the right. This observation shatters the superiority of right column news, so placed because, as the most important news, it should come to the reader's attention first; advertisers who are paying slightly higher rates for right-hand pages will encourage a fuller study to verify this finding.

Trachoma Costs in Missouri.—Since Missouri, with the assistance of the United States Public Health Service, has started the work against trachoma, some 6,100 cases have been found. Fortunately, only one in seven of these patients has suffered an incapacitating loss of sight (20/200 or less), and only 750 are on the blind pension roll. One-third of the cases have been hospitalized, with an average hospital stay of 29 days. Since in 80 per cent of the hospitalized cases the disease is arrested, at a cost to the state of

$60.32 per patient, while blindness costs the state $300 a year for each patient, the value of this early preventive and curative work is apparent.

Summer Round-Up Activities Renewed.—The beginning of the summer vacation marks also the beginning of the new summer round-up for health examinations of preschool children, which is sponsored by the National Congress of Parents and Teachers. Coincident with the opening of this year's campaign to send "the whole child to school," come last year's tabulated reports of the health survey of children entering school for the first time. Of the entire number of children eligible for this preschool examination in communities giving examinations, more than half attended the round-up examination; of these, five per cent were found to have defects of vision. The number of corrections for vision defects equalled the number of corrections for other defects: one-third of defects have received attention and have been corrected since their discovery. The extension of the program of preschool examinations to discover and promote correction of remediable defects should bring about a healthier and happier school population.

The Dictaphone as an Aid for Sight-Saving Classes.—The typewriter has assumed its permanent place as an educational tool for children in sight-saving classes; the introduction of the dictaphone promises to become as great an aid. The particular value of the dictaphone is in the recording of reading matter which it has hitherto been necessary to read several times to different sections of classes and which now, once recorded, may be used as a permanent text-record for students in different sections or in different study periods. George F. Meyer writes of its use in detail, for braille and sight-saving classes, in the March issue of the *Teachers Forum.*

Causes of Blindness Tabulated for Japan.—For the first time a nation-wide, simultaneous survey of the causes and incidence of blindness has been made in Japan. Of particular interest to those concerned with the prevention of blindness is the fact that the tabulation of causes does not identify the immediate eye disease, but lists the etiological disease leading to the eye condition. Gonorrhea,

trachoma, syphilis and malnutrition were the leading factors in the causation of eye involvement. Figures show that 11.67 per 10,000 of the population are blind; 25 per cent of the blind lost sight during the first five years of life, demonstrating the preponderance of blindness from venereal diseases and congenital causes, much of which is preventable. A detailed report of this survey may be found in the March issue of the *Journal of the Public Health Association of Japan*. A vast undertaking in education and in service awaits the Central Society for the Welfare of the Blind, of Japan, which is at present initiating a program for conservation of vision and prevention of blindness.

Research in Format of Children's Books.—Although recent years have focused attention upon the contents of books for children, little study has been made of the physical aspects of the books. Problems of format—typography, paper, spacing and illustration—have been decided upon arbitrarily, with the result that some books for children are printed in 24-point type, while others, for the same group of children, are printed in type as small as 10 point. A year ago, in Baltimore, three organizations—the Maryland Society for the Prevention of Blindness, the Public Schools of Baltimore, and the Enoch Pratt Free Library—pooled their interest in the physical aspects of books for children, and called into consultation publishers, librarians and ophthalmologists for a co-operative effort to determine what type and arrangement of printing is best suited to the eyes of children. The study has now come to the point where representatives of national organizations are being asked to assemble at a June meeting to share in this important enterprise.

Motor Health Units in Pennsylvania Check Up on Eyes.—The two traveling health units, operated by the preschool section of the Bureau of Child Health in Pennsylvania, have examined ten thousand children between the ages of two and six in the past season. The cursory examinations of the eyes of children just about to enter school led those in charge of the examinations to the conclusion that all children over four years of age should have a visual examination. The finding of a preschool child with one blind eye (which might go unnoticed through his first year at school), which

offers the possibility of saving the other and thus conserving sufficient useful vision, makes the effort in examining every child well worth while.

Physical Defects Retard School Progress.—What is the correlation between physical defect and school achievement? This is the question which the director of health and physical education of Fresno, California, schools sought to answer in making an analysis of the health and school records of 811 children in the first to sixth grades. It was found, for instance, that few children in the group who were advanced for their age had vision defects; in the group who were of normal age for their grade an equally small percentage had uncorrected visual defects; among those pupils who were retarded in their school progress, however, the percentage of defects was double that of the two other groups. Also of interest is the fact that while parents of all children with defects were notified, the parents of children in advanced and normal groups responded three times as frequently as did those of children in retarded groups. Vision defects apparently prevent the child from attending thoroughly to instruction. Such statistics should persuade parents of the importance of early examination for children and of prompt correction of defects before the school age.

Lighting Convention.—The annual Illuminating Engineering Society convention will be held this year at Lake Delavan, Wisconsin, August 28 to September 1. Facilities for a full day's visit to the Chicago Century of Progress, on Illumination Day, as well as an interesting convention program, will be offered.

New Head of Eye Social Service Committee in New York.—Miss Ruth B. McCoy, R.N., director of prevention of blindness activities of the New York State Commission for the Blind, has been named chairman of the Committee on Development of Social Service in Eye Clinics of the Medical Social Service Section of the Welfare Council of New York City. Miss Sophie M. Cunningham, director of social service in eye clinics of the New York Eye and Ear Infirmary, will serve as vice-chairman; any matters relating to the Committee may be taken up with Miss McCoy or Miss Cunningham.

Flying Glass Hazard to Be Eliminated.—Although there have been no accurate statistics on the amount of blindness or visual impairment caused by flying glass in automobile accidents, the large figures of permanent injuries and deaths caused by this hazard have led to legislative action in two states, within the past month, for the elimination of shatterable glass in automobiles. In New York State the act calling for the installation of shatterproof glass in all public motor vehicles by 1934, and in all motor vehicles by 1935, passed the legislature and was signed by the governor on May 5. A similar bill was enacted in Nebraska on May 12; and recent information tells of like action in Pennsylvania.

Sharp Decrease in Eye Accidents Follows Improvement in Goggles.—In plants where care is exercised in the prevention of eye accidents, results are concrete, and, in the case of the General Electric Company, dramatic, in the extent of the decrease of eye accidents. Following the National Safety Council's definition of eye accident as an incident of such severity as to require loss of time, the annual report of the General Electric Company shows that in 1918 eye accidents occurred at the rate of 24.62 per 1,000 employees; in 1932, 0.78 eye accidents per 1,000 were recorded. Among the reasons which explain this remarkable fall in accident rate is the fact that protective goggles, once so awkward and cumbersome that it was nearly impossible to enforce the mandatory rule for their wearing, are now made with stronger lenses and are comfortably fitted, insuring fullest employee co-operation in this protective program.

New Head of Missouri Commission for the Blind.—Mrs. Mary E. Ryder, who has been actively engaged in welfare work in Missouri, has been appointed executive director of the Missouri Commission for the Blind.

National Society Notes.—The National Society for the Prevention of Blindness is happy to announce the association of Dr. Colman W. Cutler, long a member of its Board of Directors, with its staff as special consultant and medical adviser. Dr. Cutler is serving on a voluntary basis, generously giving of his vast fund of

knowledge and experience as an ophthalmologist, to advise on the medical aspects of prevention of blindness.

Dr. Park Lewis, vice-president of the Society, has returned from Madrid, where he represented the National Society at the International Congress of Ophthalmology.

At the institute for conservation of vision, given under the auspices of the prevention of blindness department of the New York State Commission for the Blind, in Buffalo, April 28 and 29, the National Society was represented by Mr. Lewis H. Carris, managing director, Mrs. Winifred Hathaway, associate director, and Miss Eleanor P. Brown, secretary.

Mr. Carris was present and active at the public hearing in Albany, on May 4, of the bill which aimed to introduce in New York State the mandatory use of non-shatterable glass in all motor vehicles. The measure has been passed and approved by the governor.

Sight-saving classes in the Middle West were the concern of Mrs. Hathaway on a recent trip to Illinois, Minnesota, Wisconsin and Michigan. At the meeting of the Section on Ophthalmology of the College of Physicians in Philadelphia, on March 16, Mrs. Hathaway spoke on "A Layman's Impression of the Maddox Clinic." She also addressed the course in Educational Hygiene at Columbia University on May 6.

Miss Mary Emma Smith, R.N., director of nursing activities, is on an extended trip through the West; her itinerary includes the states of Iowa, South Dakota, Wyoming, Utah, Nevada and California, where she has been giving demonstrations of the technique of vision testing for young children, as well as conferences on sight conservation for school programs.

Miss C. Edith Kerby, statistician for the Society, has made several trips to the Pennsylvania Institution for the Instruction of the Blind, at Overbrook, in connection with a study of causes of blindness.

Co-operating with the Medical Information Bureau of the Academy of Medicine and the New York Tuberculosis and Health Association, the National Society broadcast its message of sight conservation over stations WEVD, WINS, and WNYC. Mr. David Resnick, publicity director, Miss Eleanor P. Brown and

Mrs. Winifred Hathaway talked, respectively, on "Saving Children's Eyes," "Eyes We Remember," and "Eyes of the Handicapped Child."

The National Society is pleased to announce the addition to its Advisory Committee of Dr. Lawrence T. Post, acting head of the Department of Ophthalmology, Washington University; and Dr. Forrest J. Pinkerton, ophthalmologist in Honolulu, and trustee of the Palama Settlement, Territory of Hawaii.

Current Articles of Interest

Illumination in Industry, W. J. Jones, *Journal of the Royal Sanitary Institute*, November, 1932, published monthly by the Royal Sanitary Institute, London, England. The relationship between lighting and the well-being of the worker and his over-all efficiency should convince employers of the practical value of providing adequate and well-diffused illumination in industry. Existing lighting practices in surveyed plants showed faults of glare, shadow and insufficient light. Recommendations based upon modern concepts of eye health are made.

Hereditary Ophthalmologic Defects, R. H. Needham, M.D., and A. E. Jackson, M.D., *Texas State Journal of Medicine*, March, 1933, published monthly by the State Medical Association of Texas, Fort Worth, Texas. Defining the term heredity, and demonstrating the course of inheritable traits, the authors urge ophthalmologists to study and recognize those eye defects which are hereditary, in the interest of the patient and of the future generations. They conclude that eye conditions are transmitted through the chromosomes by means of more or less definite laws, rather than by accident, and that the eye is probably the most common organ in the body to be influenced by hereditary factors.

Certain Motor Anomalies of the Eye in Relation to Prescribing Lenses, Conrad Berens, M.D., Paul T. Connolly, M.D., and Dorothy Kern, *American Journal of Ophthalmology*, March, 1933, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. Glasses that accurately correct refractive errors do not always give their wearers complete comfort; a routine examination for detecting motor anomalies, through measurement of fatigue of convergence and accommodation, is recommended. Treatment for various types of muscle imbalance is outlined.

Lighting Without Glare, C. E. Ferree and G. Rand, *Archives of Ophthalmology*, March, 1933, published monthly by the American Medical Association, Chicago, Ill. With the great increase in in-

tensity of illumination, it seemed advisable to approach the problem of glare elimination from a different angle from the established custom. The authors have designed a lighting fixture which uses baffles as a means of doing away with glare. The fixture, which is described and illustrated, not only diffuses the light on the working surface, but prevents intense illumination of the ceiling—a fault of indirect lighting—and it preserves the whiteness of the light, without any appreciable loss of illumination.

Workrooms Without Windows, D. W. Atwater, *National Safety News*, April, 1933, published monthly by the National Safety Council, Inc., Chicago, Ill. Since daylight illumination has been shown to be a variable commodity, completely artificial illumination in a windowless office may be called upon to supply constantly satisfactory illumination. Artificial air conditioning takes the place of natural ventilation in this windowless office; sunlight lamps are able to supply consistently the health-giving rays of natural sun; and illumination is controlled by switches and is not dependent upon the weather or the time of year. Advocates of the windowless structure claim that omission of windows reduces construction costs about five per cent and maintenance costs about 40 per cent.

Vision in Industry, John Pike, *Journal of the Royal Sanitary Institute*, November, 1932, published monthly by the Royal Sanitary Institute, London, England. Employers can assist in the movement for the prevention of blindness and visual impairment by minimizing risks of eye accidents and eye disease, by improving protective devices, and by promoting the idea of eye health. A study of the visual requirements for special occupations is recommended, to prevent accidents and to promote the general well-being and productivity of workers.

School Clinics, Edward Jackson, M.D., *American Journal of Ophthalmology*, April, 1933, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. Clinics are needed to give the eyes of school children the best supervision and help. Because parents are slow to recognize eye defects, the school should have some definite means of identifying those children who need visual

attention. While it is impossible for all children to have a thorough eye examination before entering school, those children who present health or behavior problems, or who exhibit signs of eyestrain, should have a full ophthalmological examination in the school eye clinic. Such eye service, like the orthopedic and the tuberculosis services, should form part of the general health program for school children.

Goggles, W. F. Weber, *Safety Engineering*, April, 1933, published monthly by the Safety Magazine Publishing Corporation, New York, N. Y. The variety of occupations requiring goggles demands a study of the type best suited to each position. Goggles are used as a protection against impact, against dust, against splash, and against glare and luminous rays. Descriptions are given of the type of goggles for each use; emphasis is put upon the considerations of comfort, convenience and easy visibility, as factors helping to insure their continuous wear.

The Special Features of Ophthalmic Practice in Tropical Countries, R. H. Elliot, M.D., *Folia Ophthalmologica Orientalia*, November, 1932, published quarterly by the Folia Medica Orientalia, Jerusalem, Palestine. Tropical ophthalmology represents a special field, since many of its eye problems are unique. Climate, insects, the different standards of living must be appreciated and considered by the eye physician in the tropics; trachoma and cataract are great causes of blindness in these countries, and the ophthalmic surgeon will find a broad field for experience and service.

The Blindness of Milton, W. H. Wilmer, M.D., *Bulletin of the Johns Hopkins Hospital*, April, 1933, published monthly by the Johns Hopkins Press, Baltimore, Md. Following the outline of a modern medical history card, the writer briefly fills in the early history of Milton, his family background, the account of his marriages, etc., to lead up to a description of his eye difficulty, which began at the age of 33 and developed into total blindness at the age of 44. The symptoms—subjective and objective—and the treatment are described. Diagnoses are considered and the writer points out that the symptoms resemble those of glaucoma simplex.

Foci of Attack in the Prevention of Blindness in Missouri, Harvey D. Lamb, M.D., *Journal of the Missouri State Medical Association*, November, 1932, published monthly by the Missouri State Medical Association, St. Louis, Mo. Tracing what has been done in Missouri toward preventing blindness, the author shows that trachoma was in the past the greatest cause of blindness among adults in the state, while ophthalmia neonatorum was the major cause among infants. The very active campaigns waged against babies' sore eyes and trachoma have materially reduced blindness from these causes. Present figures show new fields of prevention that must be as thoroughly considered. In the 1932 figures of children in schools for the blind it is seen that optic atrophy has assumed the major rôle in blindness in the state, among children, and is the third greatest cause of blindness among adults. Hereditary loss of sight continues to play an important part in causing blindness, and the figure has not fallen. It has been estimated by authorities in a school for the blind that the cost to the state of caring for 27 pupils, coming from seven families, has been $52,700. The author quotes the axiom that an ounce of prevention in these tragic lives would be worth a pound of cure, and the small amount of money necessary to carry on a full prevention of blindness campaign is a very small part of that which might be needed to care for cases of preventable blindness.

Some Early Ocular Symptoms of Over-Indulgence in Sugar and Sweet Farinaceous Food, A. Maitland Ramsay, M.D., *British Medical Journal*, February 18, 1933, published weekly by the British Medical Association, London, England. The intimate relationship between the visual function and the blood stream is seen in cases of over-indulgence in sugar and cakes. Adults who complain of headache, persisting after full mechanical correction of refraction, are often found to be reacting to increased amounts of sugars in the diet. In children, phlyctenular conjunctivitis may be traced to lack of a properly balanced diet. "The general make-up of children who suffer from phlyctenular conjunctivitis is such," the author states, "that they offer feeble resistance to every form of infection, consequently they fall a ready prey to the ubiquitous tubercle bacillus . . . and it is very probable that in these

patients who are attacked disordered carbohydrate metabolism has paved the way for the onset of the tuberculous infection."

Siderosis Bulbi, M. Davidson, M.D., *American Journal of Ophthalmology*, April, 1933, published monthly by the Ophthalmic Publishing Company, St. Louis, Mo. Reviewing 15 cases of siderosis bulbi in his own experience, and the records of the literature on this disease, the author concludes that the large amount of siderosis (which, in 50 per cent of the cases, leads to industrial blindness) is caused by negligence after the accident—either through a too superficial ophthalmologic examination, or none at all. The length of time for the establishment of siderosis may be as short as eight days, or may run up to several years.

The Dependence of Eye-Hand Co-ordinations upon Eye Dominance, F. H. Lund, *American Journal of Psychology*, October, 1932, published quarterly by Cornell University, Ithaca, N. Y. The author finds, through tests of eye-hand relations, that there is no definite distinction between monocular and binocular dominant vision in eye-hand adjustments. In natively left-handed persons who had been trained to use the right hand, the natural left-eyeness had also shifted to equal ability with the right eye, demonstrating the convenience of using the eye nearest the hand in general use.

Eyes and Teeth, Charles A. Bahn, M.D., *New Orleans Medical and Surgical Journal*, May, 1933, published monthly by the Louisiana State Medical Society, New Orleans, La. Approximately fifty ocular conditions have been reported which are related to the teeth, through direct extension of the dental sepsis; by involvement of teeth and eyes from a common cause; by fatigue or reflex action in which the teeth are a dominant factor; or by focal infection of a dental origin. The writer concludes with the statement that glass eyes have no vision, while porcelain teeth are able to function as well as the original ones. The eye must be saved at the expense of the teeth, if this is necessary.

The Relationship of Bacterium Granulosis to Trachoma, Ida A. Bengtson, *Science*, February 24, 1933, published weekly by the Science Press, New York, N. Y. Report of a continuing study of

the relationship between *Bacterium granulosis* and trachoma. The question is raised: If it is definitely established that *Bacterium granulosis* is the etiological factor in trachoma, then the isolation of an organism which is non-filterable from a disease which is characterized by inclusion bodies is of significance.

Retinal Detachment—Its Operative Cure, Otto Barkan, M.D., H. Gordon Smith, M.D., and S. F. Boyle, M.D., *California and Western Medicine*, April, 1933, published monthly by the California Medical Association, San Francisco, Calif. Ten years ago a survey showed that only in one case in a thousand did retinal detachment become "cured." Today, with the improved technique for localization of the retinal tear, better technique of operation upon the tear, and greater knowledge of the possible outcome, the outlook is not so dark. The writer concludes, from his own experience, that in early selected cases fifty per cent of reattachments may be obtained, with useful vision.

Preparing the Child for School, James Frederick Rogers, M.D., *Public Health Nursing*, May, 1933, published monthly by the National Organization for Public Health Nursing, New York, N. Y. Preparation for school, like preparation for life, begins before birth, and is a continuous process. Certain factors, however, should be checked at the time of school entrance: immunization to the contagious diseases, small-pox and diphtheria; elimination of contagious skin diseases; functioning of the sensory organs, particularly those of sight and hearing, and correction of strabismus, where that exists, as well as treatment of any eye disease; nutrition, teeth, and nose and throat conditions should be reviewed to eliminate the possibilities of infection.

The Examination of the Eyes, Oliver P. Bourbon, M.D., *American Medicine*, February, 1933, published monthly by American Medicine, New York, N. Y. An eye physician does not make merely an examination of the eyes for glasses; to him, examination is for the relief of symptoms which point to the eyes as the cause of the patient's discomfort. The eye physician must decide whether the cause is one of eye pathology, systemic disorder, or mechanical peculiarity of the eye, such as is involved in myopia, presbyopia,

etc. The author suggests careful refraction, and that a study be made of the interior of the eye, to discover any symptom of eye pathology or general degenerative disease. All the examinations, he finds, may be made by a non-medical technician, but only a person trained in medicine is able to evaluate and prescribe for the findings.

The Incidence of Color Blindness Among Races, Thomas R. Garth, *Science*, March 31, 1933, published weekly by the Science Press, New York, N. Y. A three-year study indicates that color blindness cannot be considered as a racial attribute although, in testing groups, it was found that an unselected group of whites showed, among males, about eight per cent color blindness, a ratio much higher than among other selected groups—Jews, Indians, Mexicans, Spanish-Americans, and Negroes. This difference may perhaps be attributed to a selective factor not concerned with racial origins.

Book Reviews

THE BLIND IN SCHOOL AND SOCIETY. A PSYCHOLOGICAL STUDY. Thomas D. Cutsforth, Ph.D. New York: D. Appleton and Company, 1933. 283 p.

A better understanding of blindness will advance its prevention. Those who work for the blind are impressed with the fact that seeing people are generally quite ignorant of the needs of the blind, and of what will best help them. One of the great disadvantages with which the blind have to contend is the lack of understanding of the blind, on the part of the seeing world in which they have to live. The psychology of the blind differs from that of people who have always had good sight. An interpreter who can help the sighted to understand the blind has been needed.

The author of this book became blind at the age of eleven. He has had the advantage which comes to the seeing child through his basic education. He had the energy and persistence to go on with study, through school and college, and graduate study in the university. He has perceived the need for an interpreter of the blind to the seeing world, and has pressed on to investigate this new field in modern psychology.

This book deals with fundamental, emotional and intellectual differences between those who have vision and those who are blind. It will do much to promote better mutual understanding. Better understanding is most needed between sighted parents and their blind children. Parents instinctively feel there is a gap between themselves and their offspring. But there has been no one to show how the gap may be bridged, and what communication can be established across it. Physicians, teachers and social workers must recognize this important need of those blind from birth, and prepare to meet it in every way possible. Careful reading of this volume will help them. The needs of all defective children will be better understood by one who has become acquainted with the psychology of the blind. "The purpose of this book is to help acquaint the seeing with the blind and the blind with themselves. Generally speaking, if a person comprehends a

problem, he can solve it. This is as true of problems of personality as it is of problems of mathematics . . . . The study is offered in dedication to the blind children of 1932, in memory of Samuel Gridley Howe, who initiated the education of the blind of this country in 1832. A century of educational opportunity for the blind has produced no leader more creative or more keenly alive to the vital problems of the blind child." These passages, from the preface, are the best introduction to the book.

The first chapter, of 24 pages, tells of "the preschool blind child." The preschool education of the child is fundamental, and furnishes the basis for all that comes after. Prof. Elliot Smith has shown that the cerebral convolutions develop, along with the macula in the retina which gives our accurate and most useful vision. Seeing and thinking come together. When sight is absent, its contribution must be replaced, as far as possible, by touch, with free motion and locomotion. But the great importance of touch is not understood by parents or teachers. Even in schools for the blind the teaching is directed along lines appropriate for the seeing child. The neglect of parents as to the cultivation of touch, for the perception of the external world—the objective education—must be corrected. All through this book are traced results of this neglect of objective training. It appears in the discussion of verbalism, words instead of reality, the sex behavior of the blind, the emotional and esthetic life of the blind and their problems.

Prevention of blindness must include prevention of its effects. An understanding of its psychological effects furnishes new reasons for such prevention. The most enthusiastic worker for sight saving will find his interest and enthusiasm renewed by a knowledge of what blindness does to the minds of its victims.

The book contains a glossary of medical and scientific terms, with which many readers may be unfamiliar. There is an appendix, stating ten problems for further study; each having a group of suggestive questions growing out of it. There is also an appendix of references, arranged according to the chapters to which they refer. An adequate index completes the book. It is a work of practical value throughout, prepared from a point of view that will be new to its readers.

EDWARD JACKSON, M.D.

THE EYE, EAR, NOSE AND THROAT, PRACTICAL MEDICINE SERIES, 1932. E. V. L. Brown, M.D., Louis Bothman, M.D., George E. Shambaugh, M.D., and Elmer W. Hagens, M.D. Chicago: The Year Book Publishers, Inc., 1932. 686 p.

Again we find before us this little review volume summarizing certain ophthalmological progress. While every contribution to the literature is not summarized in this work, the material is in general well chosen, and the book very convenient as a reference source. It must not, however, be looked upon as a substitute for the abstract departments of the various journals, but rather as a supplement. The reviewer does not feel that editorial comment is justifiable in a work devoted to reviews, as the comments must necessarily be limited to flat statements of opinion without the presentation of evidence to support such opinion, and perhaps leaving an impression in the mind of a reader that a certain really fine study is worthless. These criticisms are not intended to detract from the usefulness of the work. It is certainly very helpful to one desirous of keeping abreast of the times.

JOHN N. EVANS, M.D.

Briefer Comment

THE WORK OF THE SCHOOL NURSE-TEACHER. Marie E. Swanson, R.N. Albany: University of the State of New York, Bulletin No. 987, January 1, 1932. 87 p.

The school nurse-teacher is in the strategic position of knowing the aims of the school, the problems of the health of the pupils and the circumstances of the home. Hers is a most important task of helping the school and the home to a better fulfilling of the child. This handbook outlines in detail her duties, the techniques of completing them, and furnishes inspiration for the fullest comprehension of the position of nurse-teacher.

REPORT ON THE MEDICAL INSPECTION AND TREATMENT OF SCHOOL CHILDREN, Education Health Service, Public Health Department, Glasgow, Scotland, 1932. 58 p.

Description of the full health program for school children undertaken by the Corporation of Glasgow. Clinics for eye diseases, refraction centers for the correction of visual defects, and sight-saving classes are used for the prevention of blindness.

Contributors to This Issue

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As traffic engineer on the conservation staff of the National Bureau of Casualty and Surety Underwriters, **Mr. Maxwell Halsey** has made an intensive study of motoring hazards and means of overcoming them.

Trachoma—its prevention and its cure—has been the special study of **Dr. C. E. Rice,** passed assistant surgeon of the United States Public Health Service; he is medical officer in charge of trachoma prevention at Rolla, Mo. **Dr. Avery A. Drake,** representing the Missouri State Board of Health, is also associated with the work at Rolla.

Supervisor of sight-saving classes of northern Ohio, **Miss Olive S. Peck** has contributed widely to the improved techniques of teaching in special classes.

Among the book reviewers: **Dr. Edward Jackson** is emeritus professor of ophthalmology of the University of Colorado, and consulting editor of the *American Journal of Ophthalmology;* **Dr. John N. Evans** is director of research at the Brooklyn Eye and Ear Hospital.